NAVSHIPS 365-1978

I. C. INSTRUCTION BOOK NO. 142

SOUND RECORDER - REPRODUCER RD - 115/UN AND RD-119/UN

THE SOUNDSCRIBER CORPORATION
NEW HAVEN, CONNECTICUT

BUREAU OF SHIPS • NAVY DEPARTMENT • WASHINGTON, D. C.

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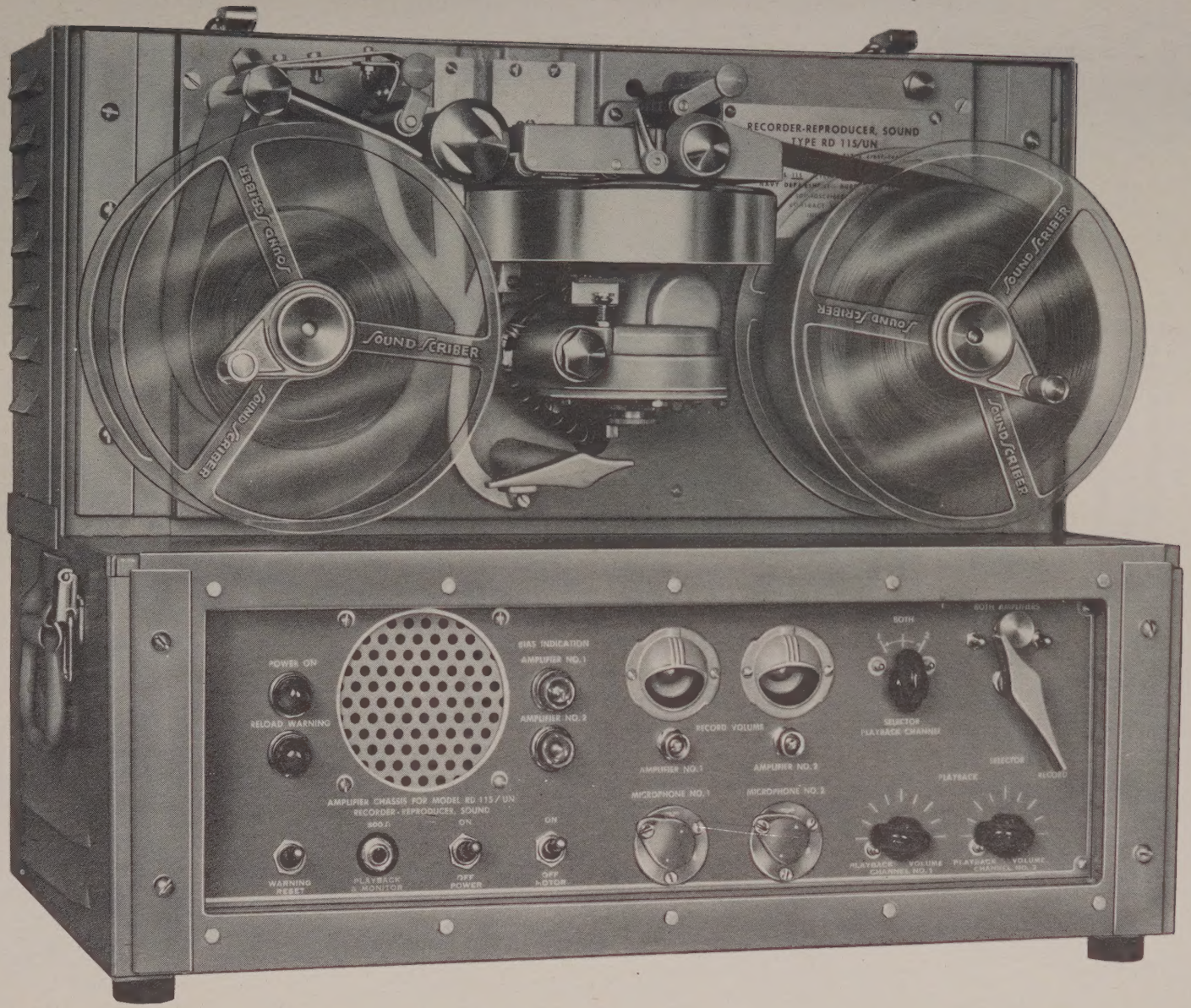
I.C. Instruction Book No. 142

SOUND RECORDER-REPRODUCER TYPE RD-115/UN

Contract NObs-54469

THE SOUNDSCRIBER CORPORATION
NEW HAVEN, CONNECTICUT

BUREAU OF SHIPS NAVY DEPARTMENT FEBRUARY, 1952



Sound Recorder-Reproducer Type RD-115/UN

SAFETY NOTICE

The attention of officers and operating personnel is directed to Chapter 65 of the Bureau of Ships Manual or superseding instructions on the subject of safety precautions to be observed.

This equipment employs voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

While every practicable safety precaution has been incorporated in this equipment, the following rules must be strictly observed:

KEEP AWAY FROM LIVE CIRCUITS:

Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside equipment with high voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors. To avoid casualties always remove power and discharge and ground circuits prior to touching them.

DON'T SERVICE OR ADJUST ALONE:

Under no circumstances should any person reach within or enter the enclosure for the purpose of servicing or adjusting the equipment without the immediate presence or assistance of another person capable of rendering aid.

RESUSCITATION

AN APPROVED POSTER ILLUSTRATING THE RULES FOR RESUSCITATION BY THE PRONE PRESSURE METHOD SHALL BE PROMINENTLY DISPLAYED IN EACH SPACE IN WHICH THE EQUIPMENT IS INSTALLED. POSTERS MAY BE OBTAINED UPON REQUEST TO THE BUREAU OF MEDICINE AND SURGERY.

EQUIPMENT DATA

1. WEIGHTS AND DIMENSIONS.

Description	*Bureau of Ships Stock No.*	Overall Dimensions (*Inches*) and Weight (*lbs.*)							
		Unpacked				*Packed*			
		Height	*Width*	*Length*	*Weight*	*Height*	*Width*	*Length*	*Weight*
Recorder-Reproducer, Type RD-115/UN (complete with dual channel mechanism, dual channel amplifier, one reel of tape, one empty tape reel, one instruction book and power cord).	S17-R-47857-5642	17 3/16	12½	21	67½	21⅞	17	25½	84½
Demagnetizer, Type MX-1373/UN (Complete with power cord).	S17-D-25491-9461	9	10 7/16	13	34	13½	15	17½	46
Tape, recording for use with RD-115/UN (3 inches wide by 1136 feet long, paper base, wound on reel, oxide in, and printed time scale on back.) Five reels of tape packed in each carton.	H17-T-16883-5689	3¼	7	7	4¾	9¾	9¾	36¼	33
Reel, tape (empty), for use with RD-115/UN. Two empty reels packed in each carton.	S17-R-220375-101	3¼	7	7	⅜	9¾	9½	14¾	3⅞
Maintenance parts kit, for use with RD-115/UN. (Includes one reel of magnetic tape).	S17-M-133502-136	9	9	18	32	12	12¾	22	41

2. INPUT POWER.

a. RECORDER-REPRODUCER. 100 to 125 volts, 60 cycles, a.c., single phase, 180 watts. The Recorder-Reproducer can be run on 50 cycles provided the cabinet rear panel is removed to give adequate ventilation.

b. DEMAGNETIZER. 100 to 125 volts, 60 cycles, a.c., single phase, 5 amperes. This Demagnetizer is designed for intermittent operation only. It should not be operated more than 15 seconds in any one minute of time. The Demagnetizer will not operate properly on 50 cycles. It is designed for 60 cycle operation only.

3. INPUT CONNECTIONS.

Input	*Location*	*Impedance*	*Source*	*Voltage Limits*
Microphone (one for each amplifier channel).	Front panel	600 ohms	600 ohm microphone (not supplied)	.002 to .2 volts
Line (one for each amplifier channel).	Rear panel	3000 ohms	Any line up to 3000 ohms	.02 to 2 volts

4. OUTPUT.

Output	*Location*	*Impedance*	*Level*	*Listening Equipment*
Playback and monitor	Internal Speaker	3.2 ohms	2 watts at 7½% distortion	Internal Speaker
Line (Playback and Monitor)	Front Panel	600 ohms	2 watts at 7½% distortion	External Equipment for 600 ohm line

5. TUBE COMPLEMENT.

Type	*Quantity*	*Symbol*
JAN 5Y3	2	V-302, V-303
JAN 6SJ7	5	V-100, V-101, V-200, V-201, V-304
JAN 6V6	3	V-102, V-202, V-305
JAN 6E5	2	V-103, V-203
JAN 6C4	1	V-301
JAN 12AU7	1	V-300

6. RECORDING TIME AND MEDIUM.

The recording medium is a red oxide paper-backed magnetic tape wound on a seven-inch diameter plastic reel with the magnetic coating wound toward the inside. To permit easy location of recorded material, the paper side of the magnetic tape is stamped in minutes to provide a time scale. The magnetic tape is three inches wide and 1,136 feet long. One reel of magnetic tape holds 24¼ hours of dual-channel continuous recording. The magnetic tape is fed at a linear speed of 9.28 inches per minute. The magnetic sound tracks travel in an arc across the width of the magnetic tape at a scanning rate of approximately four inches per second. Each of the two amplifier channels record alternate sound tracks. A metallic strip, cemented to the paper side of the magnetic tape at approximately five minutes before the end of the 24 hour recording period, actuates a visual and audible signal, indicating the need for changing the magnetic tape.

7. OPERATING CONTROLS AND INDICATORS.

a. RECORDER-REPRODUCER.

Name	*Type*	*Location*	*Purpose*
POWER ON-OFF	DPST Toggle	Front Panel	Turn complete machine on and off.
POWER ON	Incandescent lamp, green lens.	Front Panel	Glows when POWER ON-OFF switch is ON.
MOTOR ON-OFF	DPST Toggle	Front Panel	Turns motor, reload warning system and power failure system on and off. Motor drives the magnetic tape and turntable of magnetic heads.
PLAYBACK and MONITOR	Phone jack with switch section.	Front Panel	Permits connection of an external listening device to the 600 ohm output line. The switch section disconnects the internal speaker.
RELOAD WARNING	Incandescent lamp, red lens.	Front Panel	Glows when magnetic tape requires changing or when power fails. (Complete power failure function requires external battery).
WARNING RESET	Single pole, normally closed, spring return toggle switch	Front Panel	Restores the reload warning system to normal operation.
BIAS INDICATION (one for each amplifier channel)	Neon lamp	Front Panel	Indicates bias oscillator and amplifier are supplying sufficient bias voltage.
RECORD VOLUME controls (one for each amplifier channel)	Potentiometer, screwdriver slotted shaft	Front Panel	Permits adjustment of recording volume. Slotted shaft helps to prevent inadvertent movement of control.
RECORD VOLUME level indicators (one for each amplifier channel)	Electron ray tubes	Front Panel	Indicates signal level to magnetic heads.
MICROPHONE (one for each amplifier channel)	Three contact, recessed male receptacle	Front Panel	Provides means of connecting a 600 ohm or lower impedance microphone.
PLAYBACK CHANNEL SELECTOR	Three position rotary switch	Front Panel	Provides selection of playback from either or both amplifier channels and selection of monitoring from either amplifier channel.
PLAYBACK RECORD SELECTOR	Two position rotary switch with interlock	Front Panel	Provides selection of amplifier components for recording or playback. Interlock prevents inadvertent movement of the control.
PLAYBACK VOLUME (one for each amplifier channel)	Potentiometer	Front Panel	Permits adjustment of volume during playback or monitor.

Name	*Type*	*Location*	*Purpose*
SCAN Lever	Mechanical linkage lever	Above front panel	Releases the pressure rollers on the magnetic tape to provide easy movement of the tape to find a particular recording.
LOAD Lever	Mechanical linkage lever	Above front panel	Raises the pressure gate, tapered roller, tape shoe and turns SCAN lever to provide easy loading or fast winding of magnetic tape.
TUNING Lever	Mechanical lever	On pressure gate	Permits shifting of the magnetic tape to align sound tracks with magnetic heads during playback.

b. DEMAGNETIZER.

Name	*Type*	*Location*	*Purpose*
POWER ON-OFF	Single pole, normally open, spring return toggle switch	Front Panel	Turn complete machine on and off.
POWER ON	Neon lamp	Front Panel	Indicates proper demagnetizing voltage when machine is on.

8. FREQUENCY RESPONSE.

The overall frequency response of the RD-115/UN Recorder-Reproducer is flat within plus or minus 1.5 decibels between 400 and 3800 cycles with roll-off between 400 and 200 cycles of 4 to 6 decibels per octave.

9. FUSE PROTECTION.

a. RECORDER-REPRODUCER.—A three ampere fuse is provided in the AC line. This fuse is located on the rear panel.
b. DEMAGNETIZER.—A ten ampere fuse is provided in the AC line. This fuse is located on the front panel.

10. REMOTE CONTROL.

Connection terminals are provided on the rear panel of the RD-115/UN Recorder-Reproducer. These connections permit the use of a remote MOTOR ON-OFF switch, PILOT lamp, warning buzzer, and RELOAD WARNING lamp.

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MASTER DRAWINGS
RECORDER-REPRODUCER

Bureau of Ships Dwg. No.	*Name*
S6502H3158802	Final Assembly
S6502H3158803	Turntable Assembly
S6502H3158804	Mechanical Assembly
S6502F3158805	Mechanical Assembly List of Materials
S6502H3163385	Amplifier Assembly
S6502F3163386	Amplifier Assembly List of Materials
S6502H3158806	Schematic
S6502H3163387	Wiring Diagram
S6502D3137392	Maintenance Parts Kit

DEMAGNETIZER

Bureau of Ships Dwg. No.	*Name*
S6502H3163388	Final Assembly

Type RD-115 UN Sound Recorder-Reproducer

Type MX-1373/UN Demagnetizer

FIG. 1 *Type RD-115/UN Sound Recorder-Reproducer and Type MX-1373/UN Demagnetizer.*

IMPORTANT

SPECIAL INSTRUCTIONS
for
RD119/UN

This publication is issued as a basic instruction manual for the dual channel Sound Recorder-Reproducer RD-115/UN. It is also applicable to the single channel Sound Recorder-Reproducer RD-119/UN. The following are the only differences between the RD-115/UN and the RD-119/UN Recorder-Reproducers.

1. The RD-119/UN Recorder-Reproducer has one recording amplifier. The controls and connections on the front and rear panels that are applicable to channel two on the RD-115/UN are eliminated on the RD-119/UN. The four magnetic heads applicable to channel two on the magnetic head turntable* on the RD-115/UN are eliminated on the RD-119/UN. The tone generator applicable to channel two on the RD-115/UN is eliminated on the RD-119/UN. The following resistors* have been changed in the RD-119/UN: R-316; R-302; R-301; R-303; and R-304.

2. The length of the magnetic tape* used with the RD-119/UN Recorder-Reproducer is 568 feet. This provides 24 hours of single channel recording. The rate of feed of the magnetic tape is 4.64 inches per minute. The time indications stamped on the back of the magnetic tape are spaced 4.64 inches apart. The change in rate of feed of the magnetic tape is accomplished by using a spur gear* that has twice the number of teeth of item 61 of fig. 48 and by using a mounting plate (item 105 of fig. 50) that changes the location of the idler gear (item 104 of fig. 50).

TABLE OF CHANGES IN RD119/UN

Description	*SoundScriber Part No.*
Turntable	9321-A
Resistor—R-316, 3000 ohms	R-357
Resistor—R-302, 2700 ohms	R-312
Resistor—R-301, 24000 ohms	R-356
Resistor—R-303, 900 ohms	R-355
Resistor—R-304, 900 ohms	R-355
Magnetic Tape	9320-A
Spur Gear	9059

* When ordering these parts be sure to include SoundScriber part numbers given in table above.

SECTION 1

Introduction

1. This publication is issued as a basic Instruction and Service Manual for the RD-115/UN Sound Recorder-Reproducer and contains all the descriptive data and illustrations that are necessary for the operation, maintenance and overhaul of the equipment.

2. The RD-115/UN Recorder-Reproducer is a device designed to record and play back audio signals magnetically. It is designed primarily for continuous recording applications such as recording ship to shore and plane to control tower conversations. The Recorder-Reproducer is a portable unit contained in an aluminum cabinet. The mechanical chassis and amplifier chassis are self-contained units mounted in the cabinet. These units are designed so that they can be easily removed from the cabinet for rack mounting. The Recorder-Reproducer is supplied as a complete unit with a full reel of magnetic tape, an empty reel and power cord. Additional reels of magnetic tape, empty reels, a Demagnetizer and spare parts are also supplied as separate items.

3. The Recorder-Reproducer is a dual track unit containing two amplifier channels. Recordings can be made from two audio sources at the same time. Connections are provided for recording from two audio lines of 3000 ohms or lower impedance, or from two microphones of 600 ohms or lower impedance (microphones are not supplied).

4. The recording medium is a magnetically coated paper tape, three inches wide by 1136 feet long, capable of holding 24¼ hours of continuous dual channel recording. The magnetic tape travels at a slow rate of speed making it possible to change the reel of magnetic tape without stopping the machine thus permitting continuous recording over an indefinite period of time without the use of automatic switching devices.

5. Recordings made on the Recorder-Reproducer can be played back innumerable times without noticeable change in quality. Playback is possible from the recording of either channel or both channels at the same time. The recording on amplifier channel two is identified by a periodic low level tone every few seconds. The material recorded on the magnetic tape can be stored under normal conditions for an indefinite period of time without magnetic deterioration. The magnetic tape can be used over and over again for recording by erasing the previously recorded sound on the complete reel of tape in the Demagnetizer MX-1373/UN. (Erasure facilities are not provided in the Recorder-Reproducer.)

6. The MX-1373/UN Demagnetizer is a portable unit contained in an aluminum cabinet. The Demagnetizer is designed to erase the recording from a complete reel of magnetic tape. This unit is supplied complete with its power cord. A removable cover provides access to the controls and a storage compartment. The storage compartment provides a convenient place for storing the items required for splicing the magnetic tape and the special tools.

SECTION 2

Detailed Description

1. RECORDER-REPRODUCER.

a. GENERAL.—The Recorder-Reproducer consists of the following major assemblies (See fig. 2).

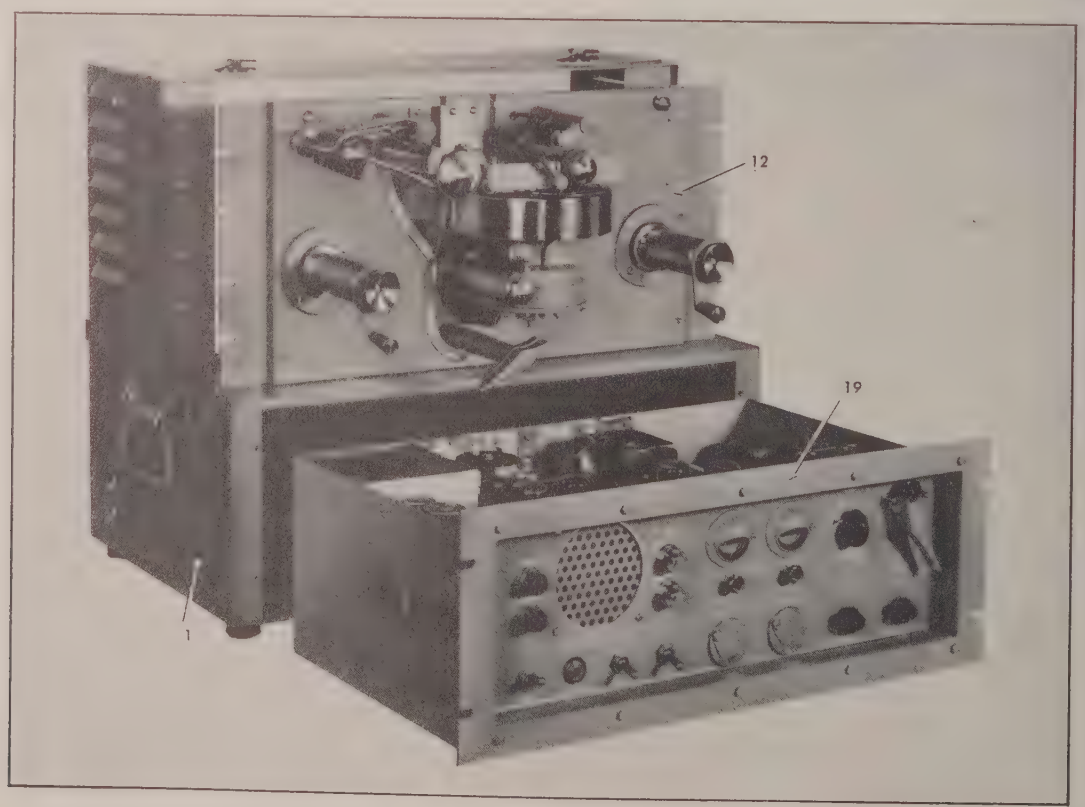
Index No.	*Name*	*SoundScriber Part Number*
1	Cabinet	9008A
12	Mechanical Chassis	9010A
19	Amplifier Chassis	9005A

b. CABINET.—The cabinet (1) is made of aluminum sheet stock. It has a front cover and rear panel. Removing the front cover gives access to the controls on the mechanical chassis (12) and the recording medium. Once the machine is set up for recording, this cover should be replaced to act as a dust cover. Removing the rear panel gives access to the rear of the mechanical chassis and the top of the amplifier chassis. The cabinet and rear panel have ventilating louvers to permit heat to escape. The cabinet is supplied with rubber feet. There are handles at each end of the cabinet to facilitate handling the equipment.

c. AMPLIFIER CHASSIS.

(1) CONSTRUCTION.—The amplifier chassis (19) is a self-contained unit. By unplugging the components on the mechanical chassis and removing the front panel screws, the amplifier chassis may be removed from the front of the cabinet. The amplifier chassis is designed so it may be mounted in a standard 19-inch rack just below the mechanical chassis. The amplifier chassis is constructed of sheet aluminum stock of ample thickness and reinforcement to provide a solid self-contained unit. The amplifier chassis contains all the electrical components with the exception of the motor, magnetic heads, end-of-tape signalling contacts and signal generator for channel two identification. These are connected to the amplifier chassis by disconnect plugs and sockets.

(2) COMPONENTS.—The amplifier chassis contains all the electrical controls, a power transformer, two input transformers, a playback output transformer, two 5Y3 rectifier tubes, five voltage amplifier tubes 6SJ7, three output tubes 6V6, one amplifier tube 12AU7, one bias oscillator tube 6C4, two electron-ray tubes 6E5, an end-of-tape signal relay,



The index numbers refer to Master Drawing S6502H3158802.

FIG. 2 *Major Assemblies—Recorder-Reproducer.*

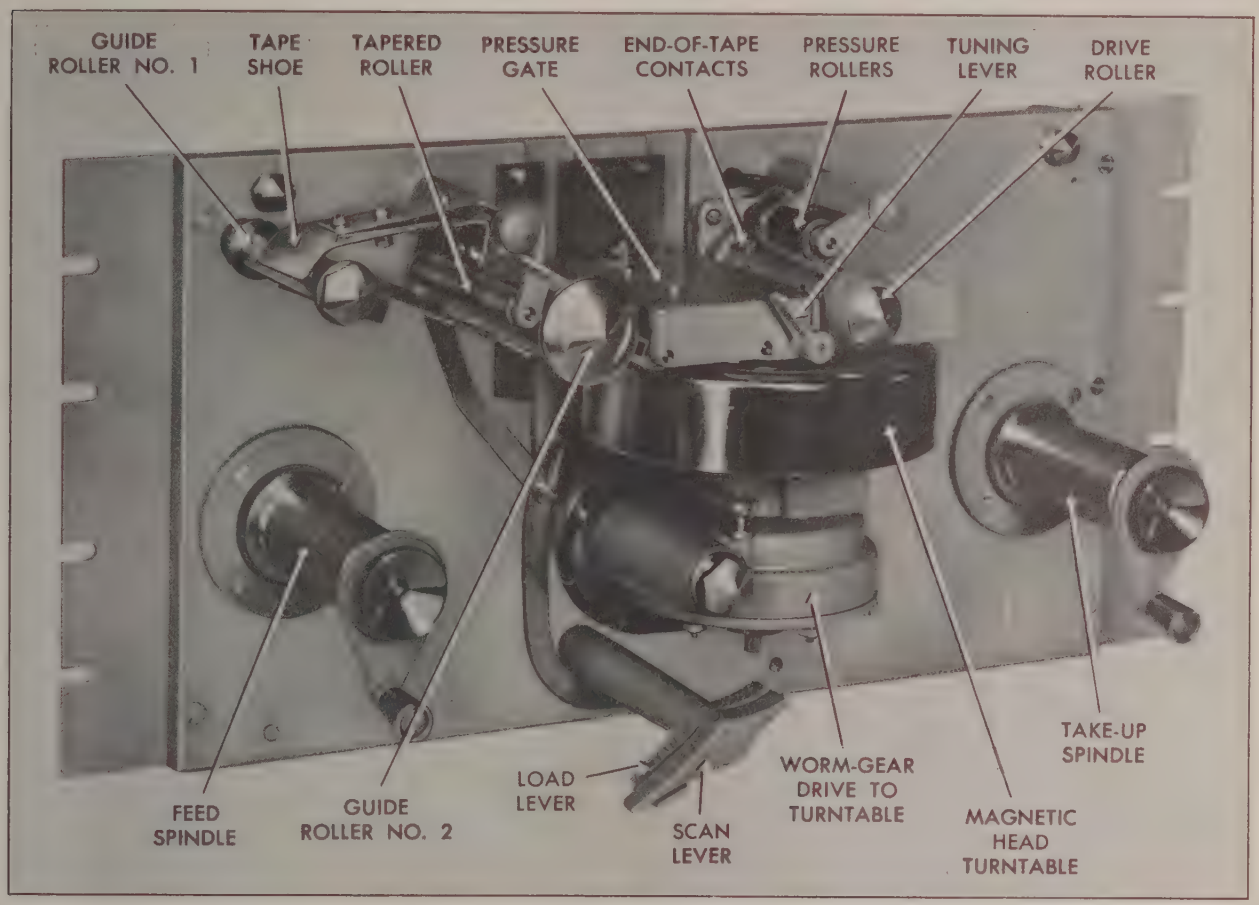


FIG. 3 *Mechanical Chassis Components, Front View.*

a power failure relay, and all the components required for B supply filtering and resistance coupling of the amplifier stages. These components are connected in a manner to permit two-channel recording or two-channel playback. The PLAYBACK-RECORD SELECTOR selects the components used for recording for both amplifier channels simultaneously when in the RECORD position and selects the components for playback for both amplifier channels simultaneously when in the PLAYBACK position. When the PLAYBACK-RECORD SELECTOR is in the RECORD position, the PLAYBACK CHANNEL SELECTOR provides switching between channel one and channel two, making it possible to listen or monitor either channel as recording is taking place. This switching does not affect the recording channels which remain independent. When the PLAYBACK-RECORD SELECTOR is in the PLAYBACK position, the PLAYBACK CHANNEL SELECTOR provides switching between channel one or channel two or provides mixing of both channels making it possible to listen to either channel or both channels at the same time while playing back. The amplifier panel contains the following controls and signaling devices: POWER, ON-OFF switch; POWER ON indicating lamp; MOTOR, ON-OFF switch; PLAYBACK and MONITOR phone jack, loudspeaker, RELOAD WARNING lamp, WARNING RESET switch; BIAS INDICATION, AMPLIFIER NO. 1 lamp; BIAS INDICATION, AMPLIFIER NO. 2 lamp; RECORD VOLUME control and electron ray tube for AMPLIFIER NO. 1 and AMPLIFIER NO. 2; MICROPHONE NO. 1 and MICROPHONE NO. 2 input plugs; PLAYBACK CHANNEL SELECTOR knob; PLAYBACK RECORD SELECTOR knob; PLAYBACK VOLUME NO. 1 knob; and PLAYBACK VOLUME NO. 2 knob.

d. MECHANICAL CHASSIS.

(1) CONSTRUCTION.—The mechanical chassis (12) is a self-contained unit. By unplugging from the amplifier chassis and removing the front screws, the mechanical chassis can be removed from the front of the cabinet. The mechanical chassis is designed so it may be mounted in a standard 19-inch rack just above the amplifier chassis. The frame of the mechanical chassis is an aluminum pressure casting.

(2) COMPONENTS.—The mechanical chassis contains the motor, the turntable with its two sets of magnetic heads, a worm gear drive from motor to the magnetic head turntable spindle, a gear drive from this spindle to the magnetic tape drive roller, a feed spindle for the reel of magnetic tape, a belt drive to the take-up spindle, the end-of-tape signal contacts, a pressure gate for the magnetic tape, guides for the magnetic tape on the guide rollers, a mechanical leverage system to release the pressure plate and guide rollers from the magnetic tape and a tone generator to identify the recordings on channel two. See figs. 3 and 4.

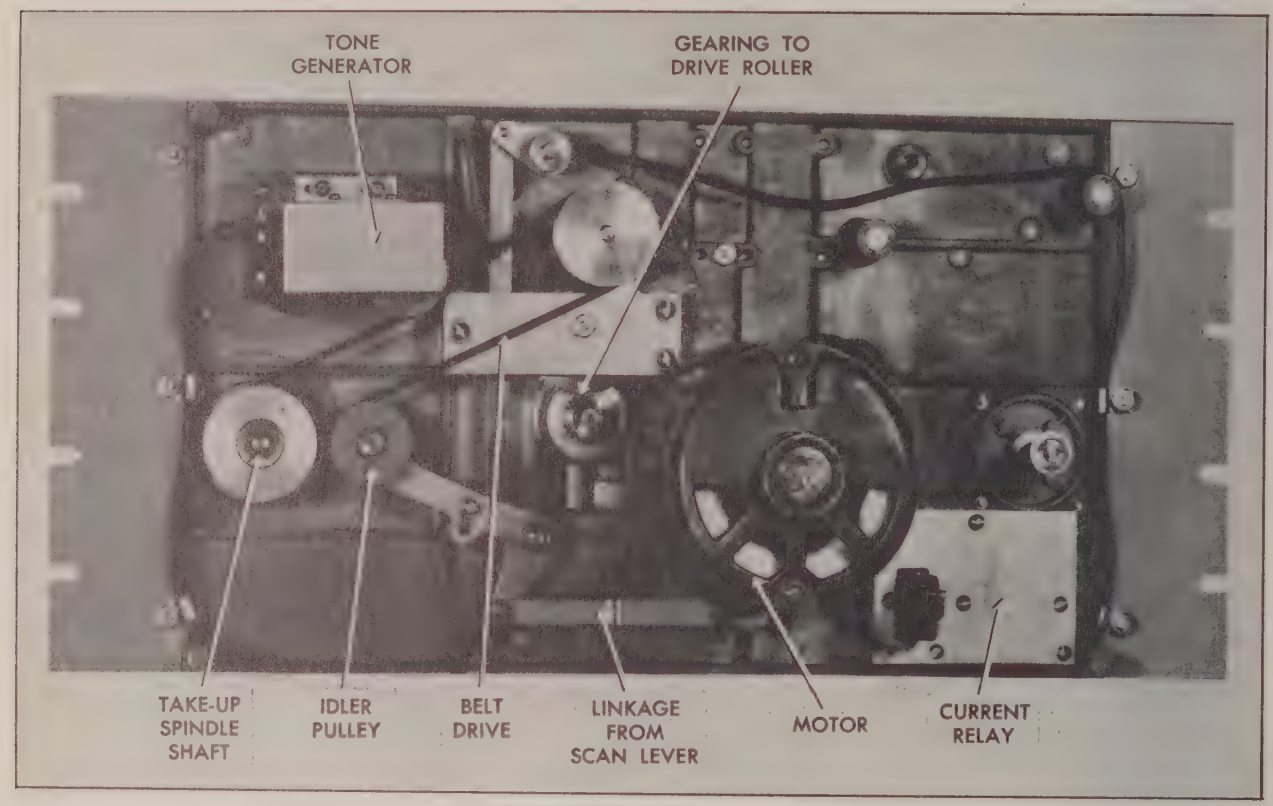


FIG. 4 *Mechanical Chassis Components, Rear View*

(*a*) *Motor.*—The motor is a four-pole synchronous motor with a synchronous speed of 1800 r.p.m. The motor contains a starting winding. This starting winding is switched in and out by a current relay mounted on the mechanical chassis.

(*b*) *Magnetic Head Turntable.*—There are eight magnetic ring-type heads mounted in a circular turntable frame. The heads are mounted equidistant from one another in a circle and their tops protruding through a metal turntable cover. The magnetic tape travels slowly over the top of these heads. The turntable rotates as the magnetic tape moves across the top of the magnetic heads making arcs of magnetic sound tracks across the magnetic tape. These magnetic heads are connected so that there are two sets of four heads, each set connected in series. One set of four heads is for amplifier channel one and the other set is for amplifier channel two. They are connected so that every other head in a rotational direction is for channel one and the other four for channel two. Thus every other magnetic track produced on the magnetic tape is one channel. There are three silver coated slip rings under the turntable to which the sets of heads are connected. One ring is common to both sets of heads. The output of both amplifier channels is fed to these three rings through spring mounted silver plated contacts.

(*c*) *Drive System of Magnetic Head Turntable.*—The shaft of the motor is connected through a flexible coupling to a shaft within the gear box under the magnetic head turntable. The flexible coupling provides a means of connecting to the motor shaft and prevents transmission of motor vibration to the rotating turntable of magnetic heads. The shaft within the gear box contains a worm. Meshed with this worm is a fiber gear. The shaft of this fiber gear is supported at top and bottom by bearings. This shaft is hollow and a smaller internal shaft is connected to the magnetic head turntable. The top part of this internal shaft has screw threads to engage a fabric filter coupling within the turntable and the fabric coupling in turn connects to the turntable. The bottom of the internal shaft protrudes through the bottom of the gear box and has a knurled circular plate at its bottom. This circular plate is fastened to the hollow gear shaft by a thumb screw. This arrangement of mechanical components rotates the magnetic head turntable at 20 r.p.m. and permits easy replacement of the turntable of magnetic heads.

(*d*) *Drive System for Tape Drive Roller.*—The magnetic tape drive roller is driven by a gear train. The shaft of the large fiber gear in the gear box under the magnetic head turntable contains a helical gear. There is a gear meshed with this helical gear whose shaft protrudes through the back of the mechanical chassis. There is a gear on this shaft meshed with an idler gear which in turn is meshed with a gear on the drive roller shaft. This gear system moves the magnetic tape at the rate of 9.28 inches per minute.

(*e*) *Feed Spindle.*—The feed spindle is a free rotating shaft mounted to the mechanical chassis through a needle bearing race. There is a thumb nut on the end of the shaft that is removed to remove the handle and reel of magnetic tape. The handle provides a means of winding the magnetic tape on the reels. The spindle has a key to rotationally lock the reel when it is placed on the spindle.

(*f*) *Take-up Reel Spindle.*—The take-up reel spindle also has a handle, thumb screw and key for locking of the reel.

(*g*) *Take-up Reel Spindle Drive.*—The take-up reel is driven by a belt and pulley system to keep the magnetic tape tight on the reel. The take-up reel is driven by a belt between the pulley on its shaft and a pulley on the shaft of the drive roller. There is an idler pulley held in position when recording or playing back that keeps the belt tight. The pulley on the take-up reel spindle has a friction slip clutch connecting it to the shaft of the take-up reel spindle. This friction clutch is provided so that the take-up reel runs fast enough to keep the magnetic tape tight on the reel as it is pulled along by the tape drive roller (capstan).

(*h*) *End-of-Tape Signal Contacts.*—There is a pair of silver finger contacts that ride along the top side (back) of the magnetic tape. At each end of the magnetic tape, five minutes before the end of the 24-hour period, there is an aluminum strip that provides connection across these finger contacts to operate the RELOAD WARNING lamp and buzzer, indicating that only 20 minutes of recording time is left on the magnetic tape on the feed reel.

(*i*) *Pressure Gate.*—The pressure gate has a flexibly hinged plate held down by spring pressure that presses the magnetic tape against the magnetic heads. This pressure gate has three guide rollers. One guide roller is mounted off-center. A tuning lever, attached to this off-center guide roller, provides a means of shifting the position of the magnetic tape relative to the magnetic heads to line up the sound tracks on the magnetic tape with the magnetic heads during playback. See fig. 4A.

(*j*) *Guide Rollers.*—The magnetic tape is guided by a group of guide rollers as it leaves the feed reel and is wound on the take-up reel. The first guide roller as the magnetic tape leaves the feed reel (guide roller No. 1) has a metallic tape shoe under spring pressure that holds the magnetic tape firmly against its surface. The next guide roller is a tapered roller that takes up the slack in the variations in the width of the magnetic tape. The third guide roller (guide roller No. 2) positions the magnetic tape before it goes under the pressure gate. The pressure gate has three guide rollers of which one is adjustable as described in the previous paragraph. The drive roller guides and also pulls the magnetic tape through the guide system from the feed reel. The rubber pressure rollers are under spring pressure to firmly press the magnetic tape against the drive roller. There is also a guide roller set in the casting frame of the drive roller that guides the magnetic tape to the take-up reel. This system of guide rollers is designed to provide an urging force to keep the center of the magnetic tape over the center of the turntable of magnetic heads.

(*k*) *Load and Scan Levers.*—Rotating the SCAN lever raises and lowers the rubber pressure rollers and engages and disengages the idler pulley. This is accomplished by a system of connecting linkages. By means of a similar mechanical linkage, the LOAD lever raises and lowers the pressure gate, the tape shoe on guide roller No. 1, and the tapered roller. The SCAN lever also rotates when the LOAD lever is turned clockwise.

(*l*) *Tone Generator.*—The tone generator develops a low level periodic tone that is applied to recording amplifier channel two. This identifies the recording on channel two. The tone generator is a coil of wire located in a permanent magnetic field. A reed armature located in an air gap of the magnetic field generates a voltage as the magnetic flux is changed by vibrating the reed armature. This armature is moved by a ratchet which in turn is fastened by a shaft to a pulley that is rotated by the belt interconnecting the drive roller and the take-up reel spindle. The voltage developed by this generator is applied to the output stage of the recording amplifier of channel two.

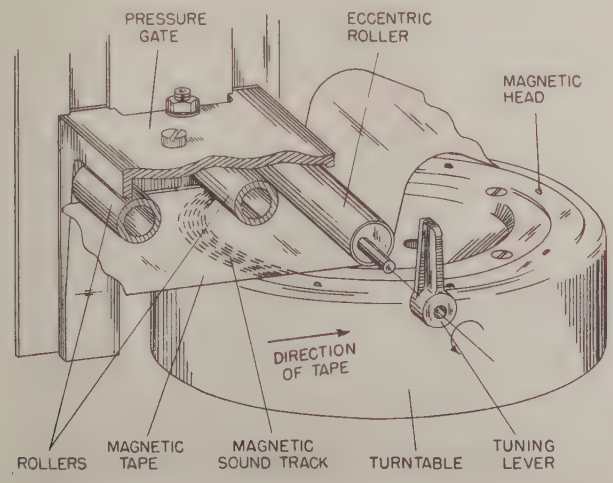


FIG. 4A *Function of Tuning Lever*

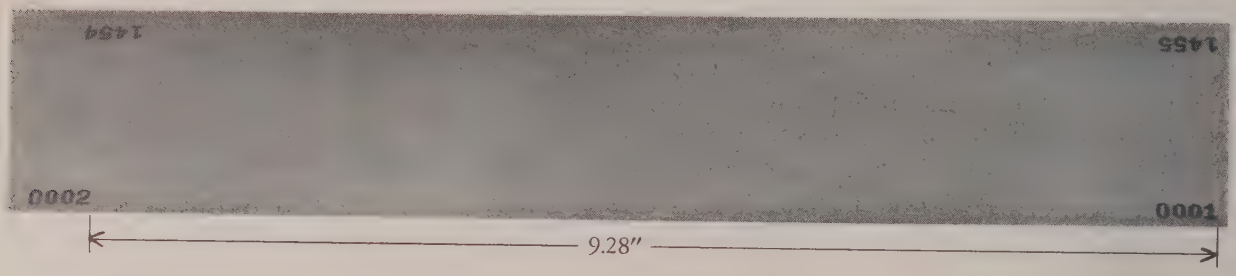


FIG. 5 *Portion of Magnetic Tape Time Scale*

2. RECORDING MEDIUM.

a. CONSTRUCTION.—The recording medium is a paper base magnetic tape wound on a seven-inch diameter plastic reel with the red oxide magnetic coating wound toward the inside. The tape is 1,136 feet long and three inches wide. To provide a means of locating recorded material, the paper side of the magnetic tape is stamped in minutes to provide a time scale (See fig. 5). There are two time scales, one starting at one end of the magnetic tape and the other starting at the opposite end of the magnetic tape. The time scales start at 0000 and end at 1456 minutes which is 24 hours and 16 minutes. One time scale is upside down with reference to the other time scale. This permits use of the magnetic tape without the necessity of rewinding. The time scale that is right side up as you face the front of the machine is the applicable scale. There is a five foot lead portion on each end of the magnetic tape to permit threading through the machine. At each end of the magnetic tape there is a small metal strip. This metal strip is located at the 1435 minute mark (five minutes before the end of the 24-hour period). These metal strips short the end-of-tape contacts that in turn light the RELOAD WARNING lamp and operate the buzzer indicating the magnetic tape must be changed. If desired, these metal strips may be removed by pulling them off and new ones placed at any desired point along the magnetic tape. Additional metal strips are supplied in the Maintenance Kit. The new metal strips must be located the same distance from the edge of the magnetic tape to be sure that they will touch the end-of-tape contacts.

b. SOUND TRACK.—The magnetic tape is recorded with magnetic sound tracks across the width of the magnetic tape (See fig. 6). The sound track is a 90 degree arc whose diameter is the same as the diameter of the circle in which the magnetic heads are mounted. There are eight magnetic heads, four for each channel. The four magnetic heads of each channel are mounted 90 degrees apart. The first sound track is made with the first magnetic head of channel one; the second sound track is made with the first magnetic head of channel two; the third sound track is made with the second magnetic head of channel one; the fourth sound track is made with the second magnetic head of channel two, etc. Every other sound track is the recording of one channel. Every eighth sound track is made with the same magnetic head.

3. DEMAGNETIZER.

a. The Type MX-1373/UN Demagnetizer is housed in an aluminum cabinet. There is a top cover which gives access to the controls and storage compartment when it is removed. There are two pole pieces protruding up from the top panel. To erase a reel of magnetic tape, the reel is set between these two pole pieces. The reel rests on two rollers that permit easy rotation of the reel during the erasing process. The Demagnetizer has a momentary on-off switch that automatically returns to the off position. A 10-ampere fuse protects the equipment. A neon lamp glows when the ON-OFF switch is held in the ON position indicating the Demagnetizer is operating.

b. The core of the magnetic pole pieces has two coils of wire wound on it. These coils of wire are connected in series with a capacitor across the incoming power line to provide a series resonant circuit. The magnetic field set up by the coils in this series resonant circuit is used to demagnetize the reel of recorded magnetic tape.

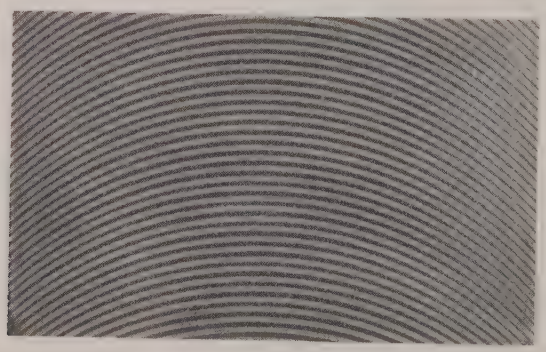


FIG. 6 *Magnetic Tape Sound Tracks*

SECTION 3
Installation

1. TYPICAL INSTALLATION.

A typical installation should include the following equipment to constitute a complete installation.

a. One RD-115/UN Sound Recorder-Reproducer for every two channels from which it is desired to record.

b. One RD-115/UN Sound Recorder-Reproducer for playback while the other machines are recording. This machine may also be used as a temporary replacement in case of failure of one of the recording machines.

c. Eleven reels of magnetic tape for each RD-115/UN Sound Recorder-Reproducer that is being used for recording. Eleven reels of magnetic tape permits a ten-day storage of recorded material before the recording is erased and the magnetic tape is reused for recording. One reel of magnetic tape is supplied with the Recorder-Reproducer and extra reels of magnetic tape are individually packed and then packed five to a carton.

d. Two empty reels. Empty reels are individually packed and then packed two to a carton.

e. One MX-1373/UN Demagnetizer for erasing the sound tracks on a reel of recorded magnetic tape.

f. One Maintenance Parts Kit for each pair of RD-115/UN equipments.

2. LOCATION.

a. RECORDER-REPRODUCER.—The Sound Recorder-Reproducer can be used in any location where a 118 volt, 60 cycle, 180 watt power source is available. The ideal site for the machine and storage of the magnetic tape is a room where the temperature is 60 to 70 degrees Fahrenheit and the humidity 40 to 60 per cent. This ideal condition, particularly for the storage of the magnetic tape, will limit the expansion and contraction of the magnetic tape.

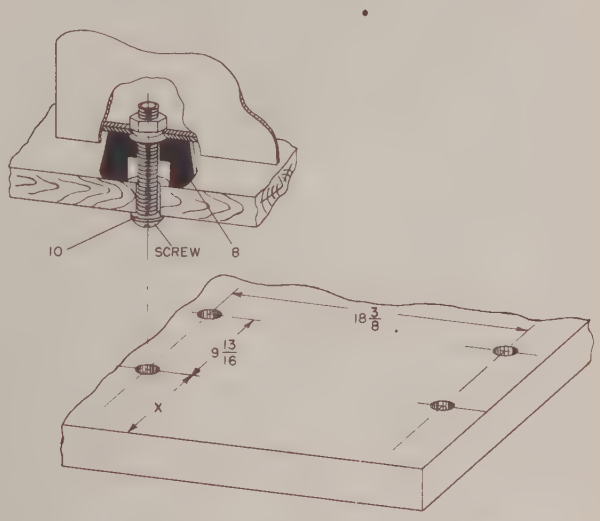
b. DEMAGNETIZER.—The Demagnetizer has a relatively strong magnetic field. Reels of magnetic tape should not be stored any closer than three feet from the Demagnetizer to prevent erasure of the recorded material on the magnetic tape. The stray field may be picked up by other equipment but the Demagnetizer is used only a few seconds once every 24 hours. The ideal site for the Demagnetizer is three feet away from all other equipment. Under no conditions should a delicate instrument, such as a watch, be placed between the pole pieces of the Demagnetizer.

3. MOUNTING.

a. GENERAL.—The Recorder-Reproducer may be set on a bench, fastened securely to the bench or mounted in a standard 19-inch rack.

b. BENCH MOUNTING.—To fasten the Recorder-Reproducer to a bench, follow this procedure:

(1) Drill four clearance holes in the bench for ¼-inch diameter screws. Use a 9/32-inch drill. This is a letter K drill which is .281 inches in diameter. Locate the holes as shown in fig. 7. If the distance x shown in fig. 7 (distance from center line of front mounting holes to front of bench) is 1¼ inches, the front of the machine will line up with the front of the bench. The distance x must be 1¼ inches more than the distance it is desired to have the front of the machine from the front of the bench. Be sure there is approximately a one-foot space between the center line of the rear mounting holes and the back of the bench to permit access to the connections on the rear panel.



The index numbers refer to Master Drawing S6502H3158802—*Final Assembly.*

FIG. 7 *Mounting to Bench*

(2) Tip up the Recorder-Reproducer unit and remove the four screws and their associated flat washers (10) that hold the rubber feet (8) to the bottom of the cabinet.

(3) Set the Recorder-Reproducer unit on its rubber feet (8) over the holes drilled in the bench.

(4) Fasten the Recorder-Reproducer unit with screws and flat washers. Use four ¼-20 machine screws. The length of the screws must be 1⅛ inches plus the thickness of the bench. (These screws are not supplied). Use the flat washers (10) that were removed in the previous step (2) or any standard ¼-inch flat washer.

c. RACK MOUNTING.—To mount the Sound Recorder-Reproducer in a 19-inch rack, follow this procedure:

(1) Remove the mechanical chassis and amplifier chassis as described in paragraphs 9*a* (1) (2) (3) and (4) of Section 8.

(2) Fasten the amplifier chassis to the rack using the two trim strips (16) and (18), the four screws (15) and lockwashers (7) that held the amplifier chassis in the cabinet.

(3) Fasten the mechanical chassis to the rack directly above the amplifier chassis. Use the two trim strips (14), the eight screws (15) and lockwashers (7) that held the mechanical chassis in the cabinet.

(4) Replace the interconnecting connectors between the amplifier chassis and mechanical chassis as described in par. 9*a* (3) (*e*) of Section 8.

(5) Replace the front cover over the mechanical chassis to act as a dust cover. Front cover should remain in place even during the recording process.

4. CONNECTIONS.

a. RECORDER-REPRODUCER.

(1) LINE RECORDING.—Line recording can be done from any signal source of 3000 ohms or lower impedance. Connect the two lines from which recording is desired to the terminals designated as INPUTS 3000 on the rear panel of the Recorder-Reproducer. The two terminals above the 3000 designation is for AMP. 1 (amplifier channel no. 1). Connect two leads from the output of one line from which recording is desired to these terminals, one lead to each terminal. The two terminals below the 3000 designation is for AMP. 2 (amplifier channel no. 2). Connect the two leads from the output of a second line to these terminals, one lead to each terminal. If the signal source is not terminated, a resistor designated R in fig. 8 should be connected across the signal source. The value of this resistor should be the same as the rated impedance of the signal source. If the signal source is separately terminated, this resistor should not be used.

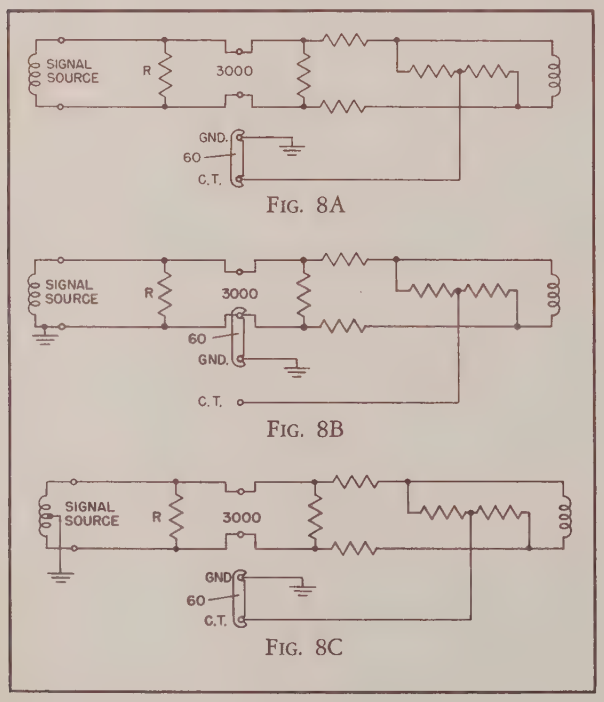


FIG. 8A

FIG. 8B

FIG. 8C

The index numbers refer to Master Drawing S6502—3163385—*Amplifier Assembly.*

FIG. 8 *Connections.*

There are two terminals on the rear panel designated as GND (ground), one for each amplifier. There are two terminals on the rear panel designated as C.T., one for each amplifier channel. This is a center tap for each input line. There is a grounding link between each C.T. (center tap) terminal and its associated GND (ground) terminal. There are three possible grounding conditions of the signal source as shown in fig. 8. Figure 8A shows an ungrounded signal source, figure 8B shows a signal source with one side grounded, and figure 8C shows a signal source with a grounded center tap. When an ungrounded signal source is used, the link (60) should be connected between the GND and C.T. terminals. See fig. 8A. When a signal source with one side grounded is used, the link (60) should be connected between the GND terminal and the adjacent 3000 terminal. See fig. 8B. When a signal source with a grounded center tap is used, the link (60) should be connected between the GND and C.T. terminals. Best results are obtained when the grounding link (60) can be left connected between the center tap and ground terminals.

(2) MICROPHONE RECORDING.—Since switching is not provided between the 3000 ohm input lines and the microphone input lines, the signal coming to the 3000 ohm input lines must be shut off by shutting off the source of the signal. Plug two 600-ohm or lower impedance microphones one into each receptacle on the front panel designated as MICROPHONE NO. 1 and MICROPHONE NO. 2. Microphones are not supplied. The terminals of the microphones must be connected to terminals 1 and 2 of the receptacles. The shield of the microphone cords and case of the microphones must be connected to terminal 3 of the receptacles.

(3) POWER CONNECTION.—Place the socket on the end of the power cord into the receptacle on the rear panel of the machine. Place the 2-contact plug on the opposite end of the power cord into a wall outlet that will supply 118 volts, 60 cycles, at 180 watts. THE EQUIPMENT IS NOW READY TO OPERATE. REFER TO SECTION 6.

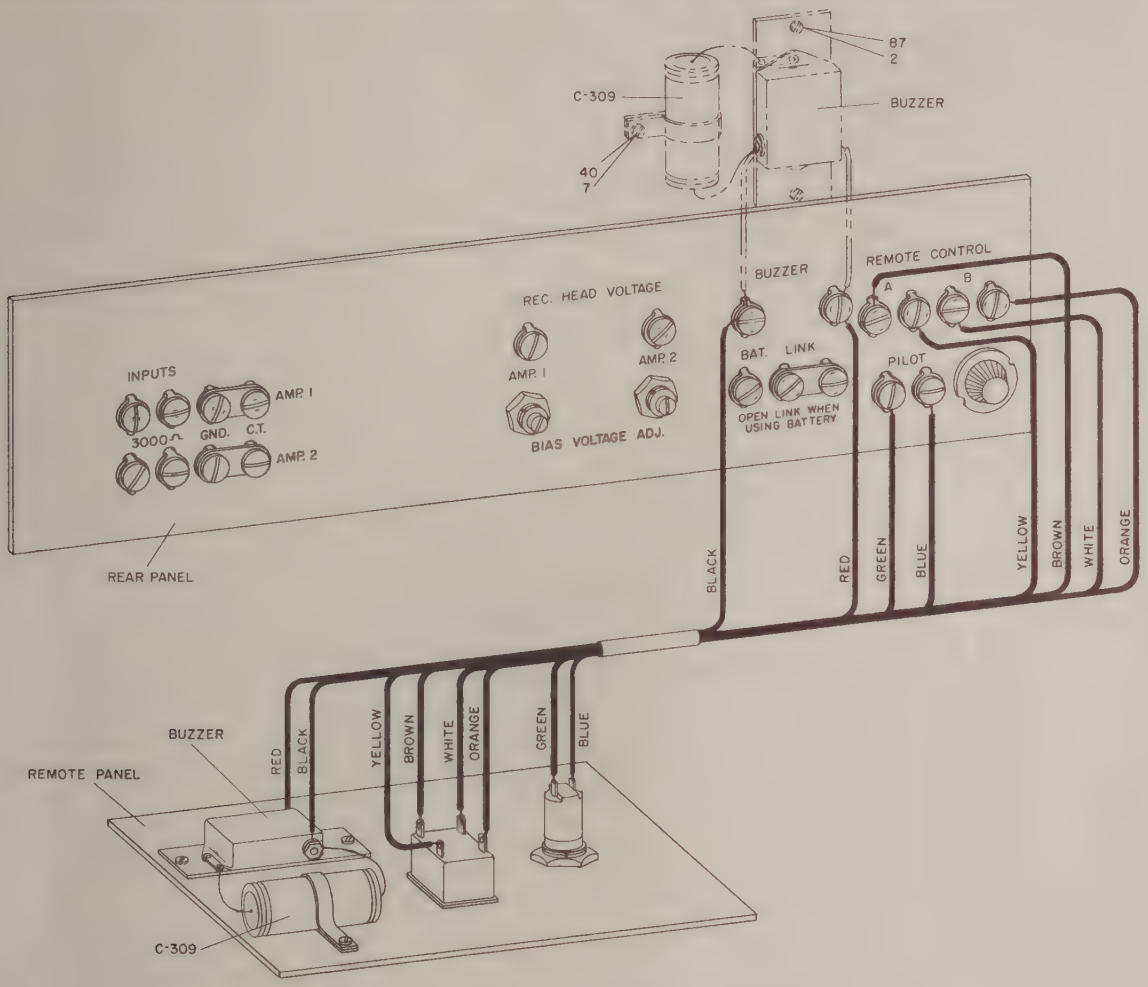
(4) EXTERNAL LISTENING DEVICE.—For confidential listening a pair of headphones may be plugged in the PLAYACK and MONITOR phone jack on the front panel. Use any type headphones of 500 ohms or greater impedance. Plugging into the phone jack disconnects the loudspeaker.

(5) REMOTE CONNECTIONS.—The following paragraphs describe a means of connecting the RD-115/UN Sound Recorder-Reproducer for remote operation and remote warning indications. These connections are not necessary for the normal operation of the machine but may be desirable in some applications. See fig. 9.

CAUTION

Before making any of the following connections, be sure the POWER ON-OFF toggle on the front panel is in the OFF position or be sure the power cord is removed from the wall outlet. (Power toggle opens both sides of the supply line).

(*a*) To remotely control the start and stop of the machine, connect the terminals of a double-pole, single-throw switch to the four terminals on the rear panel designated as REMOTE CONTROL. Connect one set of contacts on the switch to the terminals designated A and connect the other set of contacts on the switch to the terminals designated B. One pole of the switch, connected to terminals A, starts and stops the motor and the other pole, connected to terminals B, switches the reload warning and



The index numbers refer to Master Drawing

FIG. 9 *Remote Connections.* S6502—3163385—*Amplifier Assembly.*

power failure circuit on and off. Use a switch with a minimum rating of 115 volts at 3 amps. When this remote switch is used to start and stop the machine, the MOTOR ON-OFF toggle switch on the front panel must be in the OFF position.

(*b*) To provide a remote pilot lamp, use a 6 volt, .15 amp. incandescent lamp connected across the terminals on the rear panel designated as PILOT.

(*c*) To locate the buzzer at a remote point, follow this procedure:

1. Remove the rear panel of the cabinet as described in par. 9*a* (2) of Section 8.

2. Remove the screw (40) and its associated lockwasher (7) that hold the capacitor C-309 in place. See fig. 9.

3. Disconnect the leads of the buzzer from the terminals on the rear panel designated BUZZER.

4. Remove the two screws (87) and their associated lockwashers (2) that hold the buzzer in place.

5. Mount the buzzer and capacitor at a remote point and extend the leads to connect them to the terminals on the rear panel designated BUZZER.

CAUTION

Be sure to leave the buzzer mounted on its fiber base. Do not permit the extending leads to be grounded. A grounded buzzer case and/or grounded leads may cause a short circuit across the power transformer.

6. To provide a remote visual warning indication, connect a 6 volt, .15 amp incandescent lamp in parallel with the buzzer.

7. Replace the rear panel of the cabinet.

(*d*) If it is desirable to make all of these remote connections, a panel can be constructed to contain the remote start-stop switch, pilot lamp, buzzer and warning lamp. This would require an 8-conductor cord or four 2-conductor cords connected between the rear panel of the machine and the remote panel. Connect the conductors as described in the previous paragraphs.

(6) POWER FAILURE CONNECTIONS.—In normal operation, the RELOAD WARNING lamp on the front panel and the buzzer will indicate the need for changing the magnetic tape but will also indicate failure of the B supply within the equipment. These power failure indica-

tions can be battery-operated so that they also indicate power failure to the machine as well as within the machine. Follow this procedure to connect in a battery.

(*a*) Be sure the POWER ON-OFF toggle on the front panel is in the OFF position or be sure the power cord is removed from the wall outlet.

(*b*) Remove the BAT. LINK on the rear panel as indicated.

(*c*) Use a 6-volt battery.

(*d*) Connect the positive side of the battery to the terminal designated + (plus) on the rear panel.

(*e*) Connect the negative side of the battery to the terminal designated as — (minus) on the rear panel.

(7) COPYING CONNECTIONS.—Copying the recording from one magnetic tape to another requires the use of two Recorder-Reproducer units. One Recorder-Reproducer used for playback and the second used for recording. Follow this procedure to connect the Recorder-Reproducer units for copying.

(*a*) Connect one end of a two-conductor cord to the rear panel of the machine that is to record. Connect the conductors to the terminals designated as 3000 AMP. 1.

(*b*) Connect the opposite end of the two-conductor cord to a phone plug (not supplied). Connect the two conductors, one to each terminal of the phone plug.

(*c*) Insert this phone plug in the 500 OHM PLAYBACK and MONITOR phone jack on the machine that is to play back.

(*d*) Connect the power cord for each machine between the machine and a wall outlet.

(*e*) The machines are now connected to perform a copying operation. Refer to par. 5 of Section 6.

b. DEMAGNETIZER.—Follow this procedure to connect a Demagnetizer.

(1) Connect a wire from the terminal on the side of the Demagnetizer cabinet to a good ground. Make a good connection. This is a safety precaution to prevent injury to the operator in case one of the internal components should become grounded. This is important because voltages up to 950 volts are present within the unit.

(2) Place the socket on the end of the power cord in the receptacle on the back of the Demagnetizer.

(3) Place the plug on the opposite end of the power cord into a wall outlet that will supply 118 volts, 60 cycles at 5 amps.

(4) The Demagnetizer is now ready for operation. Refer to par. 2*g* of Section 6.

5. STORAGE OF MAGNETIC TAPE.

a. A shelf or rack should be built for the storage of ten reels. To eliminate the accumulation of dust and dirt, this shelf should be covered. When it is time to change the reel of magnetic tape on the machine, remove the reel of magnetic tape on the right as you face the shelf, erase the magnetic tape with the Demagnetizer and load it onto the machine. When the recorded magnetic tape is removed from the machine, the reels on the shelf should be pushed down toward the right and the newly recorded magnetic tape set on the shelf to the left as you face the shelf. This method of storage provides a sequential ten-day storage of recorded material. Figure 10 is a design of a typical storage rack.

b. If it is desired to save a particular recording for a long period of time, it is best to save the complete reel of magnetic tape or copy the recording on another reel of magnetic tape. If there are recordings on two or more reels of magnetic tape that must be correlated, it is best to save the complete reels of magnetic tape and the information typewritten for correlation.

NOTE

The original recording of an important message should be kept under strict surveillance. Always make copies or have the information typewritten for distribution.

ITEM	BILL OF MATERIAL	REQ'D.
1	TOP & BOTTOM 1/4 X 8 X 35 PLYWOOD FIR	2
2	FRONT & REAR 1/4 X 7 1/2 X 35 "	2
3	END PANELS 1/4 X 7 1/2 X 7 1/2 "	2
4	RAILS - FOR PANELS 1/4 X 1 1/2 X 7 1/2 "	4
5	STILES - FOR PANELS 1/4 X 1 1/2 X 4 1/2 "	4
6	ANGLE STRIPS 1 1/4 X 1 1/4 X 34 - FOR COVER FIR OR PINE	2
7	RAILS 1 1/4 X 1 1/2 X 34 - FOR RODS IN BOTTOM "	2
8	STRIP 1/4 X 1 X 34 - FOR HINGE SCREWS "	1
9	STRIP 1/2 X 1/2 X 34 - FOR FRONT EDGE COVER GUIDE "	1
10	RODS (OR TUBES) MAPLE DOWELS, BAKELITE, PLASTIC OR METAL	2
11	PIANO HINGE 34 LONG	1
12	LATCHES	3
13	RUBBER FEET	6
14	WOOD SCREWS - FOR HINGE	
15	WOOD SCREWS - FOR LATCHES	
16	WOOD SCREWS - FOR FEET	6
17	BRADS	
18	GLUE	

NOTE: GLUE UP ENDS, ITEMS 3, 4 & 5 & CUT DIAGONALS L. & R. ASSEMBLE ENDS TO STRIPS & RAILS ITEMS 6 & 7, WITH RODS IN PLACE.
THEN ADD FRONT & REAR, ITEMS 2, THEN TOP & BOTTOM, 1.
SAW APART AS SHOWN, SMOOTH UP EDGES, AND THEN ADD GUIDE STRIPS 8 & 9.
SAND OUTSIDE & FINISH TO SUIT.
ADD PIANO HINGE 11, LATCHES 12, & FEET 13.

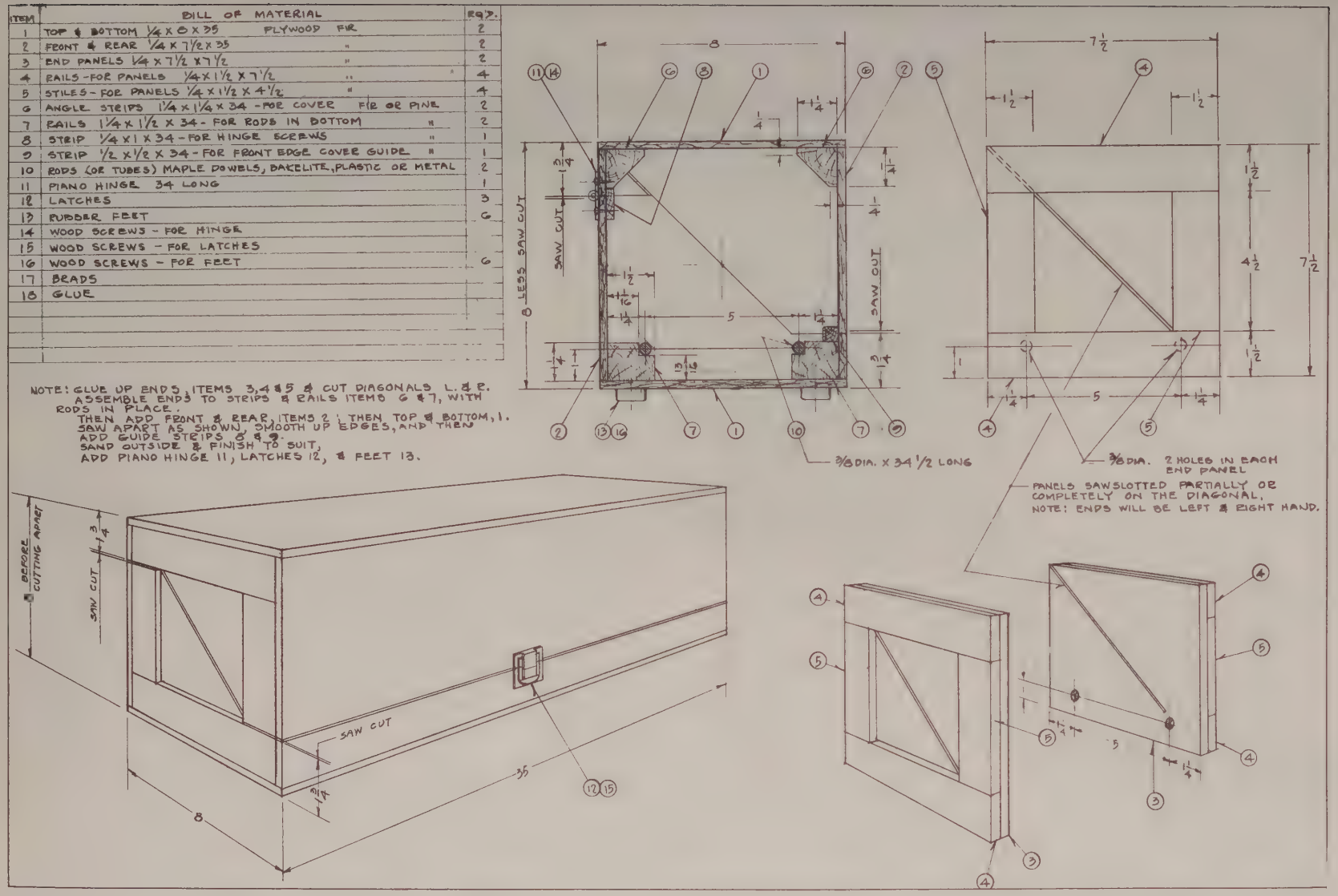


FIG. 10 *Storage Rack for Reels of Tape.*

SECTION 4

Adjustments and Tests

Perform the operations in the following chart to determine whether or not the equipment has been properly installed and is in proper operating condition. Be sure the equipment is connected as described in par. 4*a* of Section 3. Be sure signal is coming over the audio lines to be recorded. Refer to Section 6. If the ACTION in the following chart does not produce the NORMAL INDICATION, refer to the paragraph given in parentheses under NORMAL INDICATION.

ITEM NO.	ACTION	NORMAL INDICATION
1.	Demagnetize a complete reel of magnetic tape as described in par. 2*g* of Section 6.	Neon lamp on Demagnetizer must light up brightly during erasure process. (11*b* of Section 8).
2.	Load a reel of magnetic tape for recording as described in par. 1 of Section 6.	Turning the LOAD and SCAN levers should raise and lower the pressure gate, tape shoe, tapered roller and pressure rollers. (1*d* (2) (*k*) of Section 2).
3.	Place POWER ON-OFF toggle in ON position. Allow time for tubes to warm up.	The POWER ON lamp should glow. (6*a* (2) of Section 5).
4.	Place PLAYBACK-RECORD SELECTOR in RECORD position.	Both AMPLIFIER NO. 1 and AMPLIFIER NO. 2 BIAS INDICATION lamps should glow. (11*a* (2) of Section 8).
5.	Adjust both AMPLIFIER NO. 1 and AMPLIFIER NO. 2 RECORD VOLUME controls.	Both RECORD VOLUME electron-ray tubes should blink so that eye of tube just closes on peak signals. (6*a* (7) of Section 5).
6.	Place MOTOR ON-OFF toggle in the ON position.	The magnetic tape should start to feed and the turntable of magnetic heads should start to rotate. Recording should now take place on the magnetic tape. (6*a* (1) of Section 5).
7.	Momentarily short the contact fingers that contact the magnetic tape to provide end-of-tape signal with a screwdriver. Be careful not to deform the finger contacts.	The buzzer should operate and the RELOAD WARNING lamp should glow. (Operates only in RECORD position with MOTOR switch on). (6*a* (3) of Section 5).
8.	Depress and release the WARNING RESET toggle.	The buzzer should cease operating and the RELOAD WARNING lamp cease glowing. (6*a* (3) of Section 5).
9.	Place the PLAYBACK CHANNEL SELECTOR knob in the number 1 position and adjust the PLAYBACK VOLUME knob for CHANNEL NO. 1.	The signal being recorded on amplifier channel one should be heard in the loudspeaker. (6*a* (10) and (11) of Section 5).
10.	Place the PLAYBACK CHANNEL SELECTOR knob in the number 2 position and adjust the PLAYBACK VOLUME knob for CHANNEL NO. 2.	The signal being recorded on amplifier channel two should be heard in the loudspeaker. (6*a* (10) and (11) of Section 5).
11.	Return the PLAYBACK CHANNEL SELECTOR knob to the BOTH position.	No signal should be heard from the loudspeaker. (6*a* (10) and (11) of Section 5).
12.	Place the PLAYBACK-RECORD SELECTOR in the PLAYBACK position.	Both AMPLIFIER NO. 1 and AMPLIFIER NO. 2 BIAS INDICATION lamps should go out. (6*a* (8) of Section 5).
13.	Place the LOAD-SCAN control in its fully clockwise position. Rotate the left-hand reel counterclockwise until the place where you started the test recording is over the guide roller (88). Return LOAD-SCAN control to its fully counterclockwise position.	Turning the LOAD-SCAN control should raise and lower the pressure gate, tape shoe, tapered roller and pressure rollers. (1*d* (2) (*k*) of Section 2).
14.	Place the PLAYBACK CHANNEL SELECTOR knob in the 2 position.	

ITEM NO.	ACTION	NORMAL INDICATION
15.	Adjust the CHANNEL NO. 2 PLAYBACK VOLUME knob to the desired listening volume.	Turning the knob clockwise increases the volume, and turning it counterclockwise decreases the volume. (*6a* (10) and (11) of Section 5).
16.	Adjust the tuning knob (move it back and forth).	As the tuning knob is adjusted, the signal should come in strong and fade out similar to tuning a station on a radio. This tuning knob lines up the magnetic tracks of recording with the magnetic heads. Listen for low level periodic tone that identifies recording on channel 2. If identifying tone cannot be heard, move the tuning lever in either direction to next sound track. The recording with the low level periodic tone signal is the recording of channel two. (*1d* (2) (*i*) of Section 2).
17.	Place the PLAYBACK CHANNEL SELECTOR knob in the 1 position.	The recording on the other amplifier channel should be heard in the loudspeaker. (*6a* (10) and (11) of Section 5).
18.	Adjust the CHANNEL NO. 1 PLAYBACK VOLUME knob to the desired listening volume.	Turning the knob clockwise increases the volume and turning it counterclockwise decreases the volume. (*6a* (10) and (11) of Section 5).
19.	Place the PLAYBACK CHANNEL SELECTOR knob in the BOTH position.	The recording from both channels should be heard in the loudspeaker, (*6a* (10) and (11) of Section 5).
20.	Place the LOAD lever in the clockwise position, wind up the magnetic tape on either reel and remove the reel of magnetic tape.	

SECTION 5
Principles of Operation

1. RECORDING.

The exact theory of all aspects of magnetic recording is complex and not fully explainable at this stage of the art. However, the following explanation may help to understand some of the principles involved. A magnetic recording can be made on any magnetically sensitive material such as a wire or tape of a suitable steel composition or on a tape or even a disc with a suitable magnetic sensitive coating. The most popular form is a magnetically coated paper or plastic tape. Signals to be recorded are passed through a coil of wire wound on an iron core which has a minute air gap. This is usually called a magnetic head. The magnetic tape is drawn past the air gap of the magnetic head and the varying currents of the signal are recorded as varying degrees of magnetization. Figure 11 shows a magnetic recording head in contact with a magnetic tape. The dashes in the tape and in the magnet of the recording head indicate by their direction and concentration the magnetic condition of any particular part of the system.

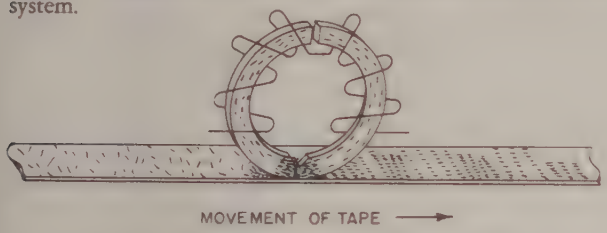


FIG. 11 *Principles of Magnetic Recording.*

To the left of the recording head the dashes are completely disoriented at random. This state of disorientation is one which exists in a demagnetized magnetic material and represents an erased or unrecorded magnetic tape. While recording there is an intense field indicated by a bunching of the dashes across the air gap of the magnetic recording head where it makes contact with the magnetic tape. This intense field penetrates the tape causing the dashes to be oriented as shown to right of the recording head. The amount of orientation is proportional to the amount of current flowing in the recording head. There is a maximum of orientation or magnetic energy that can be stored in the material. This corresponds to the maximum signal which can be recorded on the material. The ratio between this maximum signal and the noise in the process is the dynamic range of the recording material (signal-to-noise ratio). The noise is due to random disorientation in the tape, hum, etc. In almost all magnetic recording, it is customary to apply a high frequency a-c signal to the recording head along with the audio signal to be recorded. This signal has a frequency above the audio range and is called a-c biasing. It cannot be heard during playback. In general, magnetic biasing is used to obtain a substantially linear relationship between the amplitude of the signal to be recorded and the remanent flux density in the recording medium. Curve A of fig. 12 shows the non-linear relationship that exists between the recording input and output when recording without bias. Curve B of fig. 12 shows a desirable linear relation which exists between recording input and output when biasing is added. The absolute values of the frequency and amplitude of the a-c magnetic bias must be chosen to obtain the desired frequency response, distortion and signal to noise ratio of a given recording medium.

2. ERASURE.

Since a magnetic recording consists of a varying degree of magnetization, it is possible to demagnetize or erase a magnetic recording leaving it in a completely neutral or disoriented condition. This effect is accomplished by subjecting the magnetic tape to a very strong alternating current magnetic field and then permitting the strong magnetic field to slowly decline electrically or by moving the tape away from it. The strong magnetic field causes the magnetic state of the tape to go back and forth from one extreme position to the other, removing in the process any previous recordings in the tape and as the field in the tape is gradually diminished, it restores to a neutral condition. The result of this operation is a complete disorientation of the magnetic state of the tape. In conventional magnetic tape recorders, the strong magnetic field is applied by an erasing head to the magnetic tape just before the magnetic tape reaches the recording head. The RD-115/UN Recorder-Reproducer is not supplied with an erasure head. Instead, the MX-1373/UN Demagnetizer is supplied as a separate unit to provide the strong magnetic field for erasure of the whole reel of tape in bulk. This strong magnetic field is developed across coils that are in series resonance with a capacitor. The resonance condition develops a high voltage across the coils which in turn develops a highly intense magnetic field.

3. PLAYBACK.

The magnetic heads used for recording are also used for playback. When the air gap of the magnetic head is in contact with the moving tape, the magnetically-recorded variations are induced in the poles of the magnetic head. The induced magnetism in the poles of the magnetic head appears as voltage across the coils of wire that are wound on these poles. This voltage is then fed to an amplifying system which increases the signal level to a point suitable for operating a loudspeaker.

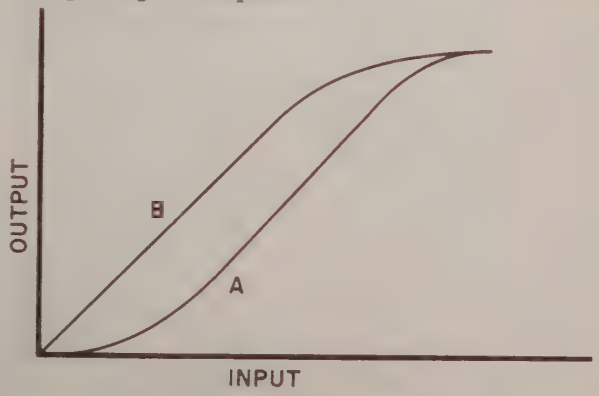


FIG. 12 *Principles of Magnetic Recording.*

4. EQUALIZATION.

A recorder should play back the recorded sounds so that they have practically the same intelligibility and naturalness as the sound applied to the recorder. To help accomplish this, the frequency response of both the recording and playback amplifiers must be equalized or compensated to make up for the deficiencies lost in transferring some of the audio signals to and from the magnetic tape. To compensate for recorded losses in the high frequency range, the recording amplifier has a rising characteristic at the high frequencies as shown by curve 2 of fig. 40. To compensate for losses in the low frequency range, the playback amplifier has a rising characteristic at the low frequencies as shown by curve 1 of fig. 40. These two characteristics result in an overall frequency response that has substantially the same intensity at all frequencies as shown by curve 3 of fig. 40.

5. MAJOR DIVISIONS.

a. GENERAL.—The Type RD-115/UN Sound Recorder-Reproducer has two major divisions. The first is mechanical and the second is electronic. The mechanical components drive the magnetic tape and the turntable of recording heads. The electronic components apply the signal to be recorded onto the magnetic tape and also transmit the sound from the recorded tape to the loudspeaker.

b. MECHANICAL.

(1) The primary source of power to drive the magnetic tape and turntable of magnetic heads is obtained from the motor. See fig. 13. This motor contains a starting winding that is switched into the circuit by a current relay whose coil is connected in series with the running winding. When the motor starts, the relatively heavy current drawn by the running winding operates the current relay which connects in the starting winding. When the motor reaches synchronous speed, the relatively smaller current drawn by the running winding of the motor causes the current relay to drop out thus disconnecting the starting winding of the motor.

(2) The turntable of magnetic heads is caused to rotate by a worm gear reduction connected through a flexible coupling from the motor shaft to the magnetic head turntable. The flexible coupling reduces the motor vibration to the turntable and automatically aligns the motor shaft.

(3) The magnetic tape is caused to move past the magnetic heads by the drive roller. Rubber rollers, applied by spring pressure to the back of the magnetic tape, press the magnetic tape firmly against the drive roller to provide a positive feed. The drive roller is caused to rotate by a gear train between the turntable spindle of the magnetic heads and the drive roller. The take-up reel for the magnetic tape is caused to rotate by a belt drive between a pulley on the drive roller shaft and a pulley on the take-up spindle shaft. The driving force applied by the belt drive to the pulley on the take-up spindle shaft is applied to the take-up spindle through a friction clutch. The friction of this clutch is much less than the feed friction at the drive roller but is heavy enough so that the magnetic tape is always wound reasonably tight on the take-up reel without forcing the magnetic tape to slip at the drive roller. The speed of the take-up reel is fast enough to keep the magnetic tape tight on the take-up reel. The take-up reel runs faster when the reel is empty than when it is nearly full. Therefore, the reel slips more and more on the friction clutch as the take-up reel fills up with magnetic tape.

(4) The magnetic tape is guided by a system of rollers from the feed reel, over the magnetic heads to the take-up reel. A pressure plate within the pressure gate presses the magnetic tape downward against the top surface of the magnetic heads. The idler pulley and pressure rollers are mechanically linked to the SCAN lever. Rotating the SCAN lever clockwise raises the pressure rollers and disengages the idler pulley. Rotating the SCAN lever counterclockwise lowers the pressure rollers and engages the idler pulley. The pressure gate, tape shoe and tapered roller are mechanically linked to the LOAD lever. Rotating the LOAD lever clockwise raises the pressure gate, tape shoe and tapered roller and turns the SCAN lever clockwise. Rotating the LOAD lever counterclockwise lowers the pressure gate, tape shoe and tapered roller.

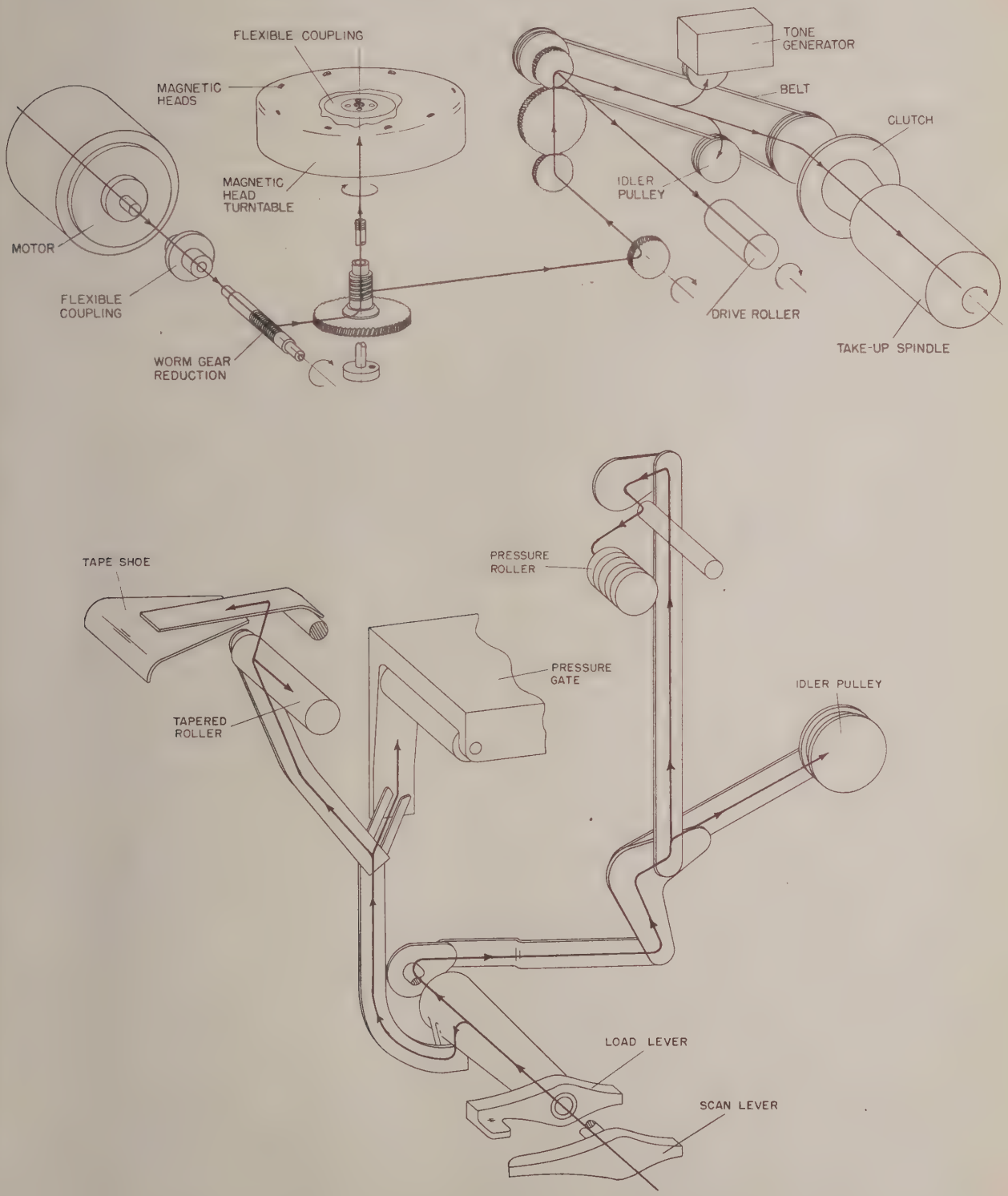


FIG. 13 *Mechanical Components—Pictorial.*

c. ELECTRONIC.

(1) The amplifier of the Type RD-115/UN Sound Recorder-Reproducer contains two separate recording amplifiers to permit two-channel recording. A PLAYBACK-RECORD SELECTOR switch provides switching of the amplifier components so that the first two amplifier stages of each amplifier are used for playback from either or both channels. Following these first two stages there is also a voltage amplifier stage and output stage to provide the remainder of an amplifier for playback. This same output stage is also used for monitoring the signals during recording. Figure 14 is a block diagram showing the components used for recording and monitoring. Figure 15 is a block diagram showing the components used for playback.

(2) During recording, the signal input applied to the line terminals or microphone receptacle of either amplifier channel is applied to the first voltage amplifier stage through an input transformer. See fig. 14. The signal is then amplified by two resistance-coupled voltage amplifier stages that use 6SJ7 tubes. The signal is then applied to the output stage (6V6) and then to the magnetic heads. The signal to the magnetic heads is applied by the magnetic heads to the magnetic tape as modulated magnetism. The signal from the output stage is also applied to an electron-ray tube 6E5 to provide a visual indication of recording level. A high frequency biasing voltage is also applied to the magnetic heads. This magnetic biasing voltage is derived from an oscillator circuit containing a 6C4 tube. This tube provides magnetic biasing for both amplifier channels. The magnetic bias is then amplified by a 12AU7 tube. One-half (½) of the 12AU7 is used for one amplifier channel and the other half of the 12AU7 is used for the other amplifier channel. The magnetic biasing voltage is applied from this 12AU7 tube to the magnetic heads of each channel. The signal for monitoring is taken from each amplifier recording channel just ahead of the output stages. The monitoring signal from the desired channel is selected by PLAYBACK CHANNEL SELECTOR switch. The signal is then fed to an output stage using a 6V6 tube. This 6V6 output tube is connected to an output transformer in a conventional single-ended output manner. The signal from the output transformer is fed to the phone jack and loudspeaker.

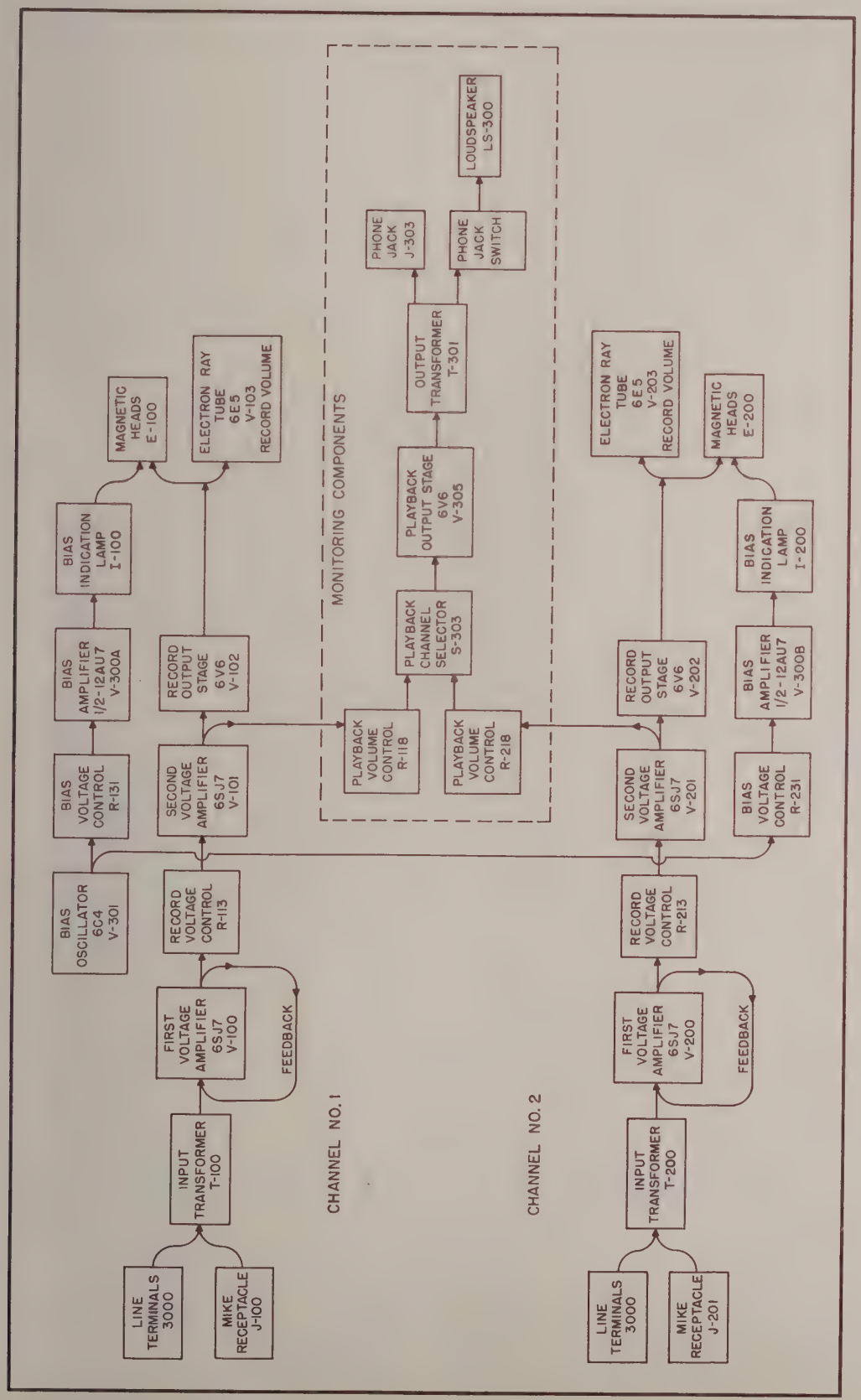


FIG. 14 *Recording and Monitoring Circuits—Block Diagram.*

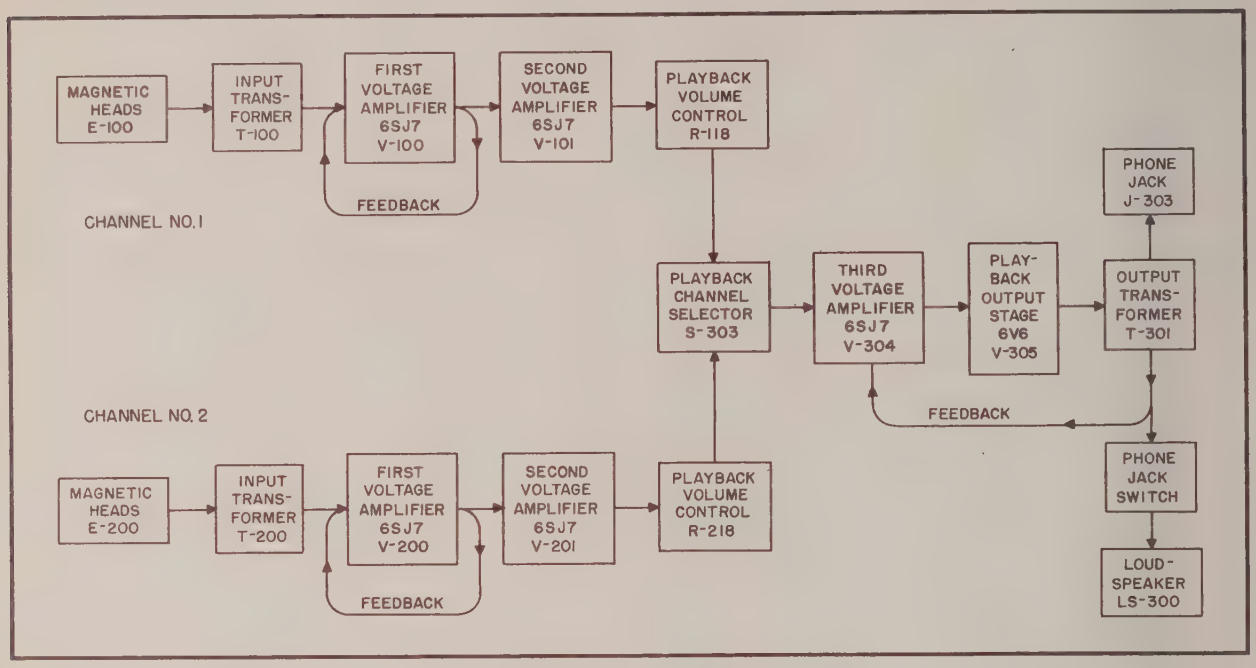


FIG. 15 *Playback Circuits—Block Diagram.*

(3) During playback, the signal of each channel on the magnetic tape is picked up by the magnetic heads and applied to the input transformer as signal voltage. See fig. 15. This signal is then amplified by the two resistance-coupled voltage amplifier stages using 6SJ7 tubes. Each amplifier channel has a PLAYBACK VOLUME control. The PLAYBACK CHANNEL SELECTOR permits playback from either or both amplifier channels. The signal from these amplifier stages is then amplified by a voltage amplifier stage using a 6SJ7 tube and applied to a 6V6 output tube and to an output transformer connected in a conventional single-ended manner. The signal from the output transformer is fed to the phone jack and loudspeaker. A feedback voltage is also taken from the output transformer and applied to the amplifier stage preceding the output stage.

(4) The complete amplifier is powered by a transformer and two 5Y3 rectifier tubes in parallel. The purpose of the two 5Y3 tubes is to reduce the possibility of failure of the equipment.

(5) The amplifier contains two relays. One relay operates the RELOAD WARNING lamp and buzzer. This relay is actuated by the end-of-tape contacts or the second relay which is a power failure relay. Five minutes before the end of the 24-hour recording time on the magnetic tape, the first relay operates the RELOAD WARNING lamp and buzzer indicating the need for changing the magnetic tape. If the 5Y3 rectifiers fail, the power failure relay operates the first relay and thus the RELOAD WARNING lamp and buzzer. This is an indication of power failure.

6. CIRCUIT ANALYSIS.

a. RECORDER-REPRODUCER.

(1) POWER INPUT AND MOTOR.—Power is supplied to the machine by the power cord W-301. See fig. 16. Plug P303 is a standard two-contact wall plug. Connector P302 is a female two-contact twist-lock connector and its mating receptacle J-302 is a recessed two-contact twist-lock male connector located on the rear panel. The complete machine is fused by the 3-ampere fuse F-300. This fuse is located on the rear panel. Switch S-300 is the POWER ON-OFF toggle switch located on the front panel. It is a double-pole, single-throw switch that turns the power on and off to the complete machine. Switch S-301 is the MOTOR ON-OFF toggle switch located on the front panel. It is a double-pole, single throw switch. As shown in fig. 16, one pole turns the motor on and off, and the second pole is used in the reload warning circuit. The terminals designated A are two screw terminals on the rear panel designated as REMOTE CONTROL A. Connecting a remote switch across these terminals will start and stop the motor. Receptacle J-301 is a four-contact polarized female connector mounted in the top of the amplifier chassis. Its mating connector P-301 is a four-contact male polarized plug. The motor B-300 is a synchronous type motor with a running winding and starting winding. One

ide of the running winding and one side of the starting inding are connected together within the motor. The eads from this common point and the opposite side of the tarting and running winding terminate at terminals 1, 2 nd 3 of the male connector P-304. Its mating connector -304 is a three-contact polarized socket mounted on the erminal board holding the relay K-300 located on the rear f the mechanical chassis. The common side of the running nd starting windings of the motor is brought to the high ide of the power line through the MOTOR ON-OFF witch S-301. The low side of the starting winding of the notor is connected to the low side of the power line hrough the relay contacts K-300B. The low side of the running winding of the motor is connected to the low side of the power line through the relay coil K-300A. Relay K-300 is a current relay located on the rear of the mechanical chassis. When the motor is turned on, the relatively high starting current (approximately 0.7 amperes) drawn by the running winding causes the relay K-300 to operate. This closes the relay contacts K-300B that connect in the starting winding. When the motor reaches synchronous speed the relatively lower current (approximately 0.4 amperes) drawn by the running winding of the motor causes the relay to drop out thus opening the contacts K-300B and disconnecting the starting winding while the motor is operating.

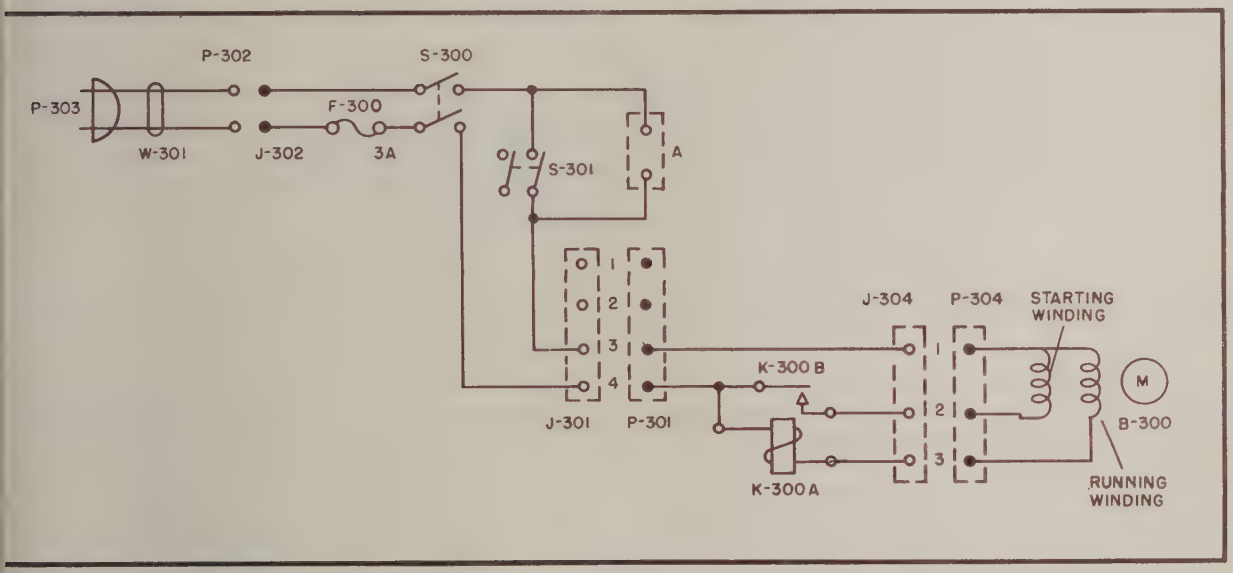


FIG. 16 *Power Input and Motor—Circuit Diagram.*

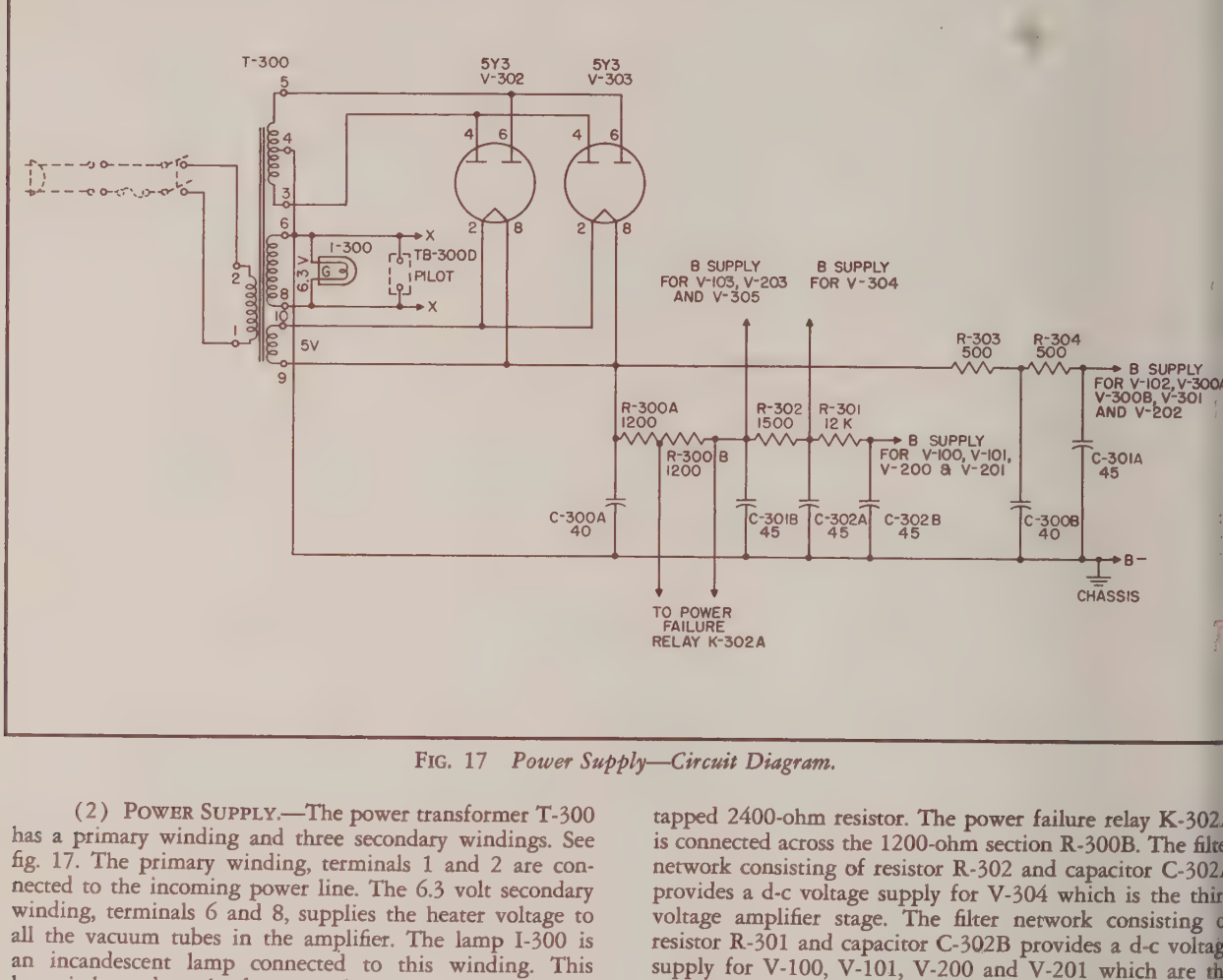


FIG. 17 *Power Supply—Circuit Diagram.*

(2) POWER SUPPLY.—The power transformer T-300 has a primary winding and three secondary windings. See fig. 17. The primary winding, terminals 1 and 2 are connected to the incoming power line. The 6.3 volt secondary winding, terminals 6 and 8, supplies the heater voltage to all the vacuum tubes in the amplifier. The lamp I-300 is an incandescent lamp connected to this winding. This lamp is located on the front panel. It has a green lens and designated as POWER ON. This lamp has a 12 to 16 volt rating to provide longer life. The terminals TB-300D are screw terminals located on the rear panel and designated PILOT. These terminals are also connected to the 6.3 volt secondary winding. These screw terminals permit connection of a remote pilot lamp. The high voltage secondary winding, terminals 3, 4 and 5, and the 5-volt secondary winding, terminals 9 and 10, are connected to the rectifier tubes V-302 and V-303 in a conventional manner to provide full wave rectifiication. The elements of the rectifier tubes V-302 and V-303 are connected in parallel to provide protection against failure. One tube is capable of carrying the load of the complete amplifier but a second tube connected in parallel provides protection against failure of the machine in case one of the tubes fails. Capacitors C-300A and C-300B are 40-mfd. electrolytic capacitors mounted in the same can. Capacitors C-301A and C-301B are 45-mfd. electrolytic capacitors mounted in the same can. Capacitors C-302A and C-302B are also 45-mfd. capacitors mounted in the same can. The filter network consisting of capacitor C-300A, resistor R-300 and capacitor C-301B provides a d-c voltage supply for V-103, V-203 and V-305 which are the RECORD VOLUME electron-ray eye tubes for each amplifier channel and the output stage for playback and monitor. The resistor R-300 is a center-tapped 2400-ohm resistor. The power failure relay K-302 is connected across the 1200-ohm section R-300B. The filte network consisting of resistor R-302 and capacitor C-302 provides a d-c voltage supply for V-304 which is the thir voltage amplifier stage. The filter network consisting o resistor R-301 and capacitor C-302B provides a d-c voltag supply for V-100, V-101, V-200 and V-201 which are th first and second voltage amplifier stages of each amplifie channel. The filter network consisting of resistors R-30 and R-304 and capacitors C-300B and C-301A provide a d-c voltage supply for V-102, V-300A, V-300B, V-30 and V-202 which are the record output stages of eac amplifier channel, the bias amplifier stage of each amplifie channel and the bias oscillator. The low side of the B sup ply (B—) is connected to the chassis.

(3) RELOAD AND POWER FAILURE WARNING.— The lamp I-301 located on the front panel and designate as RELOAD WARNING and the ac-dc buzzer I-302 ar the visible and audible warning indications. See fig. 18 When the buzzer I-302 operates and the lamp I-301 glows they indicate the magnetic tape must be changed or th rectifier tubes V-302 and V-303 or their respective com ponents have failed. The buzzer I-302 and lamp I-30 are operated through a system of switches and relay con tacts from the 6.3 volt secondary winding of the powe transformer. Switch S-304B is the second wafer from th front panel of the PLAYBACK-RECORD SELECTOR Terminals 1, 2, 3 and 4 of this wafer, shown in the PLAY BACK position, select this warning circuit so that it op erates only during recording. Relay contacts K-302B ar open during operation as its associated relay coil K-302A is connected to the B supply. If the rectifier tubes V-30

and V-303 fail, this relay coil K-302A will de-energize and cause its associated contacts K-302B to close thus connecting the lamp I-301 and buzzer I-302 through the switch S-301 to the 6.3 volt winding of the power transformer. This power failure circuit can be operated by 6-volt battery instead of the 6.3-volt secondary winding of the power transformer. This will indicate power failure to the machine as well as within the machine. To operate the power failure circuit from a battery, the mechanical link located on the rear panel and designated BAT. LINK, must be disconnected and a 6-volt battery connected to the terminals designated + and — on the rear panel. When power failure occurs under these conditions, the relay coil K-302A will de-energize and close its associated contacts K-302B to connect the buzzer I-302 and lamp I-301 through the switch S-301 to the battery. Switch S-301 is the MOTOR ON-OFF switch located on the front panel. This power failure circuit operates only when this switch is in the ON position. The terminals designated as TB-300H are screw terminals located on the rear panel and designated REMOTE CONTROL B. When a remote switch is used to start and stop the machine, connection must also be made from the remote switch to these terminals to operate this power failure warning circuit. The purpose of this switch is to disconnect the battery when the power failure circuit is operated by battery and the machine is shut off. The contacts E-300 are the end-of-tape contacts that touch the back of the magnetic tape as the magnetic tape is feeding through the machine. These contacts are connected to the amplifier chassis through terminals 1 and 2 of the 4-contact polarized connectors P-301 and J-301. There is a small aluminum strip located on the back of the magnetic tape approximately five minutes before the end of the 24-hour recording time on the magnetic tape. This aluminum strip shorts the contacts E-300 causing the relay coil K-301A to energize. When the relay coil K-301A energizes, it closes its associated contacts K-301B and K-301C. When contacts K-301C close, they operate the buzzer I-302 and RELOAD WARNING lamp I-301 indicating that the magnetic tape must be changed. When relay contacts K-301B close they hold the relay K-301A energized until the operator comes to the machine and operates the WARNING RESET switch S-302. This switch S-302 is a normally closed, spring return single-pole toggle switch. Operating the switch S-302 opens the circuit to the relay coil K-301A thus de-energizing it and causing the buzzer I-302 and RELOAD WARNING lamp I-301 to cease operating.

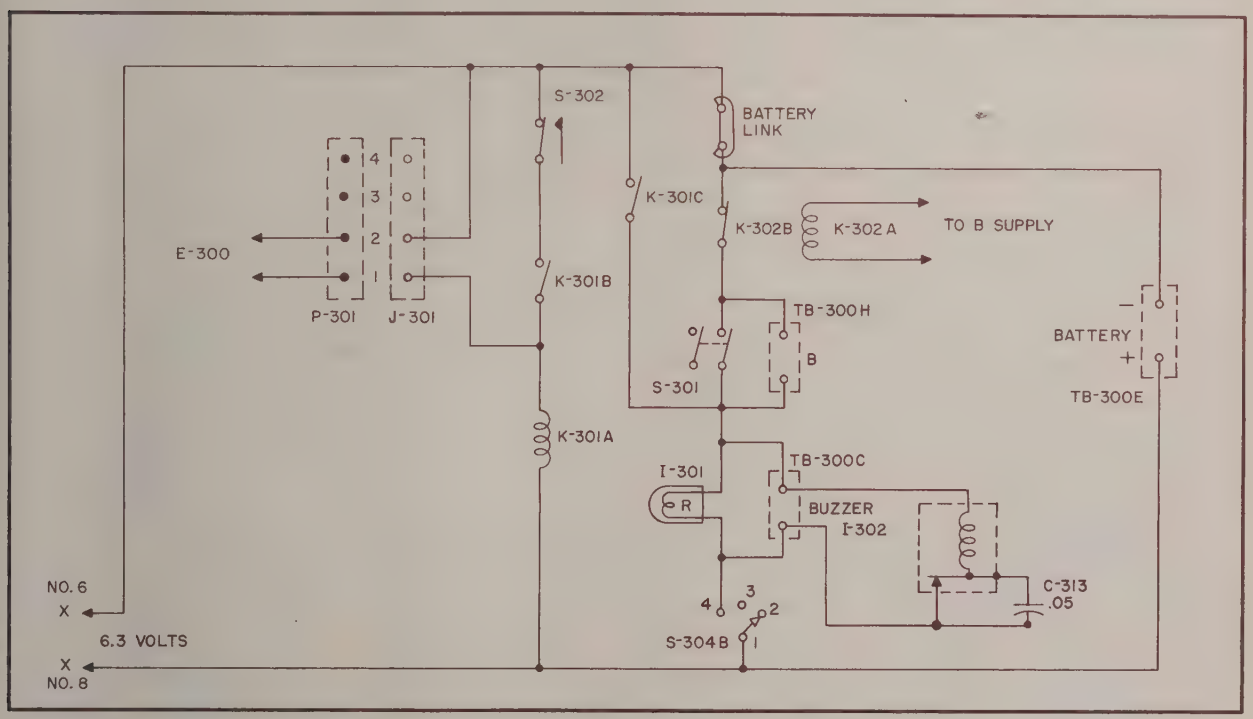


FIG. 18 *Reload and Power Failure Warning—Circuit Diagram.*

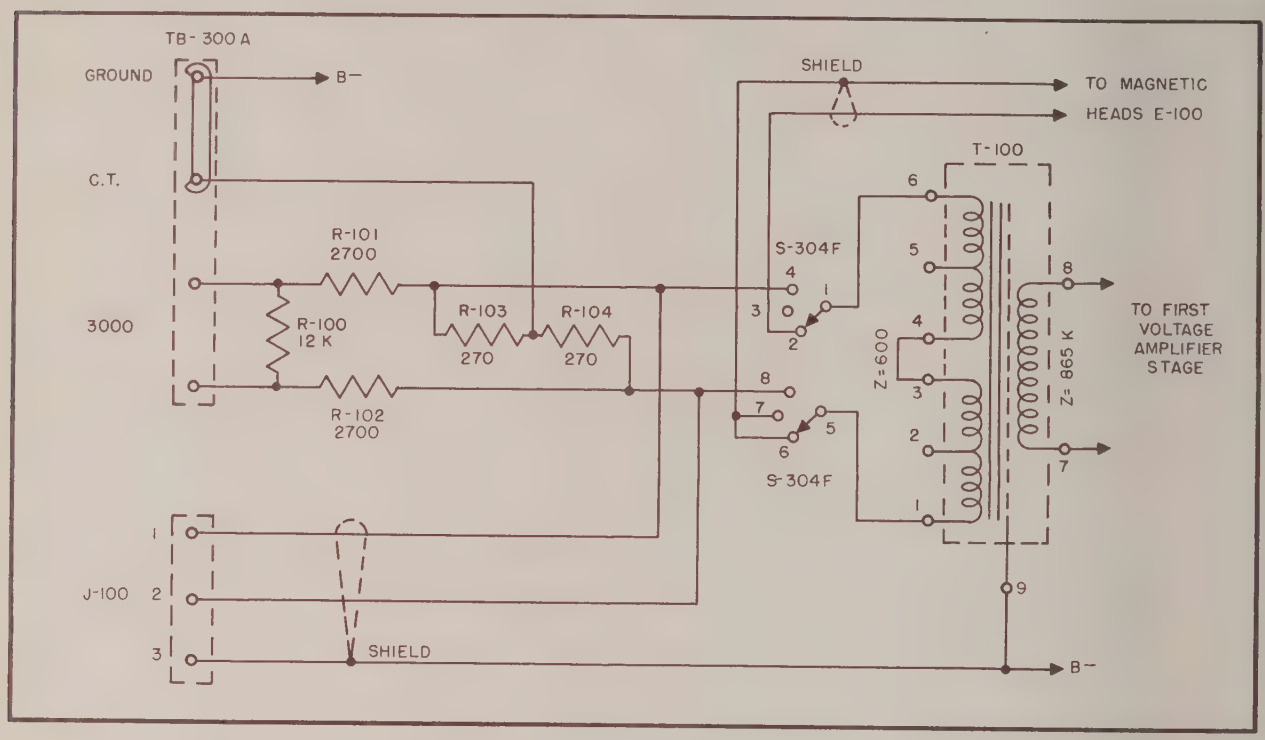


FIG. 19 *Audio Input—Circuit Diagram.*

(4) AUDIO INPUT.—The terminals on terminal strip TB-300A are screw type terminals on the rear panel designated as 3000, C.T. and GND. See fig. 19. These terminals provide connection to the audio input for line recording. Any audio line whose impedance is 3000 ohms or lower may be connected to the terminals designated 3000. The terminal C.T. provides a center tap connection. The GND terminal provides a ground connection to B—. The resistor network consisting of the 12K-ohm resistor R-100 and the 2700-ohm resistors R-101 and R-102 provide attenuation from the 3000-ohm line terminals to the primary winding of the input transformer T-100. The 270-ohm resistors R-103 and R-104 provide a center tap connection and a load to the primary winding of the input transformer T-100. The receptacle J-100 is a three-contact male connector located on the front panel and designated as MICROPHONE NO. 1. This connector provides a means of connecting a microphone. This receptacle is connected to the input by means of a two-conductor shielded cord. The terminals 1 and 2 are connected to the input by the conductors of the cord and terminal 3 is connected to ground by the shield. These input circuits are connected to the primary winding of the input transformer T-100 through the PLAYBACK-RECORD SELECTOR wafer switch S-304F when this switch is in the RECORD position. When the PLAYBACK-RECORD SELECTOR is in the PLAYBACK position, the magnetic heads E-100 are connected to the primary winding of the input transformer T-100. The wafer switch S-304F is the sixth wafer from the front panel of the PLAYBACK-RECORD SELECTOR. The terminals 1, 2, 3 and 4, and the terminals 5, 6, 7 and 8 of this wafer switch provide the switching of the input circuits. The input transformer T-100 has a low impedance multi-tapped primary winding and a high impedance secondary winding. The terminals of the primary winding are connected to provide 600 ohms impedance. The 86.5K-ohm secondary winding is connected to the input of the first voltage amplifier stage. The internal shield and the case of the input transformer T-100 are connected to B— to provide adequate shielding. The description in this paragraph has applied to amplifier channel number one. There is an exact duplicate of this circuit for amplifier channel number two.

(5) FIRST VOLTAGE AMPLIFIER STAGE.—The first voltage amplifier stage contains a 6SJ7 pentode tube V-100 connected in a conventional resistance-coupled manner to

provide class A amplification. See fig. 20. The audio signal from the secondary winding of the input transformer T-100 is connected to the grid circuit of this stage. The PLAY-BACK-RECORD SELECTOR wafer switch S-304F selects between the 15K-ohm resistor R-106 when in the PLAY-BACK position and the 51K-ohm resistor and .0047-mfd. capacitor when in the RECORD position. Switch S-304F is the sixth wafer from the front panel of the PLAYBACK-RECORD SELECTOR. Terminals 9, 10, 11 and 12 of this wafer provide this switching. When in the PLAYBACK position, the combination of the 240K-ohm feedback resistor R-110, the 220K-ohm grid resistor R-105, and the 15K-ohm resistor R-106 provides a fixed amount of feedback. When in the RECORD position, the combination of the 240K-ohm feedback resistor R-110, the 220K-ohm grid resistor R-105, the 36K-ohm resistor R-107 and the .0047-mfd. capacitor C-100 provides feedback that is deficient in high frequencies thereby increasing the high frequency amplification of this stage while recording. The 5-ohm resistor R-108 reduces the filament voltage to this stage to reduce the hum from this stage. The bias for this stage is obtained by the 1500-ohm cathode resistor R-109. This resistor is by-passed by the 50-mfd. capacitor C-101. The screen grid receives its d-c voltage supply through the 1.2-meg resistor R-111 and by-passed by the .05-mfd. capacitor C-102. The plate receives its d-c voltage through the 220K-ohm plate load resistor R-112. The .05-mfd. capacitor C-103 is a coupling from the plate of this stage to the grid of the second voltage amplifier stage. The 6SJ7 tube V-100 of this stage and the input transformer are mounted on a fiber terminal board which, in turn, is shock mounted by means of rubber grommets to the amplifier chassis. This reduces the effect of a microphonic condition. The description in this paragraph has applied to amplifier channel number one. There is an exact duplicate of this circuit for amlifier channel number two.

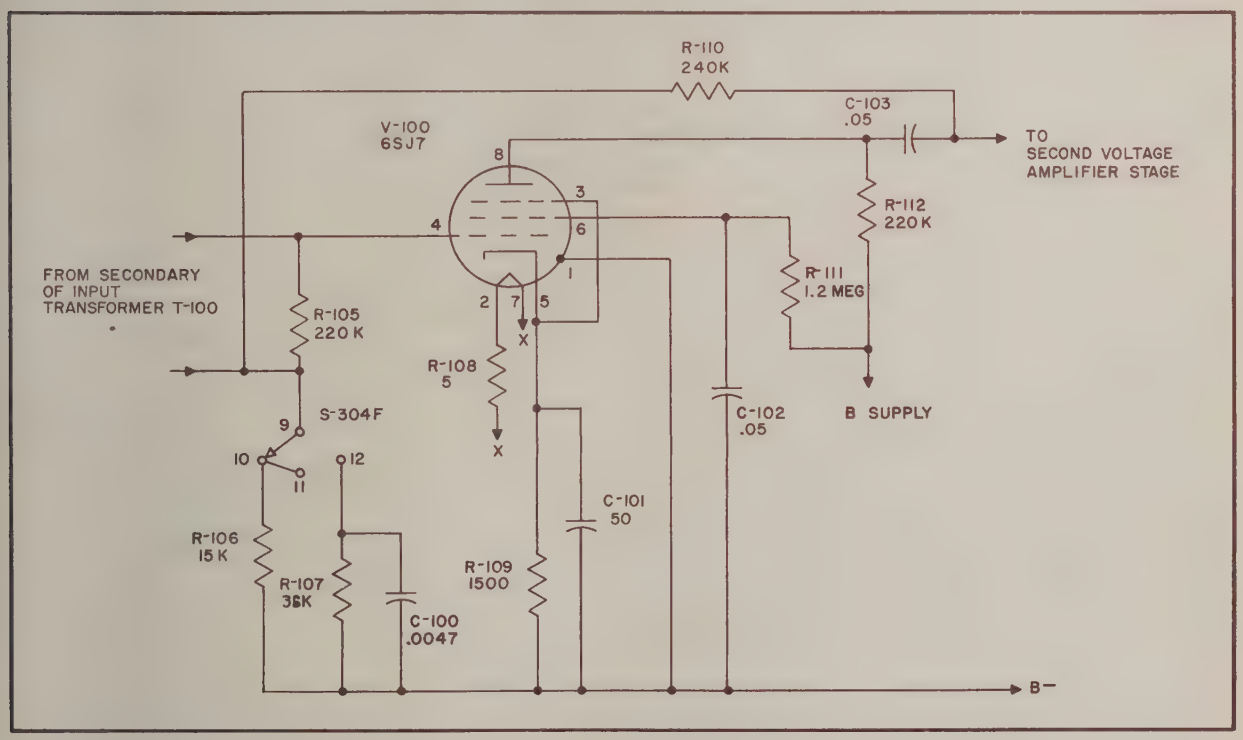


FIG. 20 *First Voltage Amplifier Stage—Circuit Diagram.*

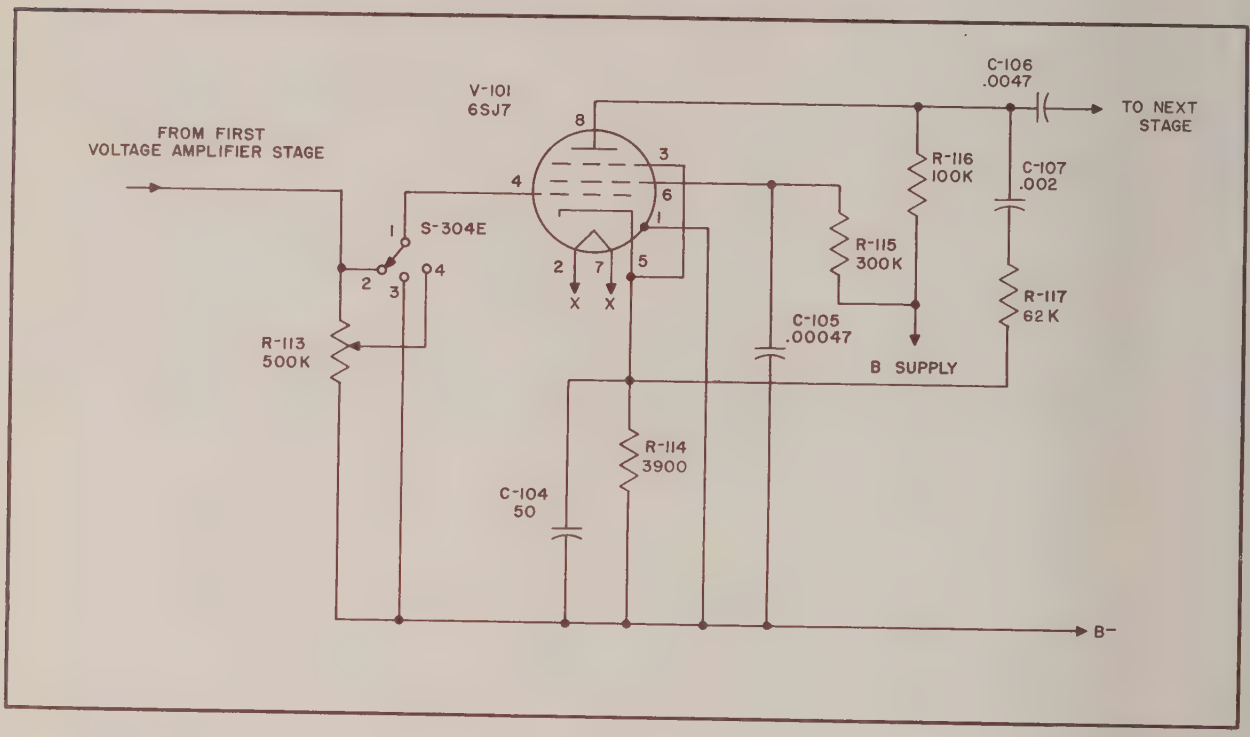


FIG. 21 *Second Voltage Amplifier Stage—Circuit Diagram.*

(6) SECOND VOLTAGE AMPLIFIER STAGE.—The second voltage amplifier stage contains a 6SJ7 pentode tube V-101 connected in a conventional resistance-coupled manner to provide class A amplification. See fig. 21. The audio signal from the first amplifier stage to the grid of the second stage is switched by the terminals 1, 2, 3 and 4 of the PLAYBACK-RECORD SELECTOR wafer switch S-304E. This is the fifth wafer from the front panel. In the PLAYBACK position, the grid is connected directly to the audio output from the first stage. In the RECORD position, the grid is connected to the 500K-ohm potentiometer R-113. This potentiometer is the RECORD VOLUME control located on the front panel. The bias for this stage is obtained by the 3900-ohm cathode resistor R-114. This resistor is by-passed by the 50-mfd. capacitor C-104. The screen grid receives its d-c voltage supply through the 300K-ohm resistor R-115 and by-passed by the .00047-mfd. capacitor C-105. Since the .00047-mfd. capacitor C-105 is inadequate for by-passing frequencies below 1000 cycles, there is low frequency degeneration in this stage thereby accentuating the frequencies above 1000 cycles. The plate receives its d-c voltage through the 100K-ohm plate load resistor R-116. The .0047-mfd. capacitor C-106 is a coupling from the plate of this stage to the grid of the next stage. The .002-mfd. capacitor C-107 connected in series with the 62K-ohm resistor R-117 acts as a tone control to give a gradual low frequency accentuation from 3800 to 200 cycles. The description in this paragraph has applied to amplifier channel number one. There is an exact duplicate of this circuit for amplifier channel number two.

(7) RECORD OUTPUT STAGE.—The recording output stage contains a 6V6 beam power amplifier tube V-102 connected as a triode in a conventional single-ended manner to provide constant current through the magnetic heads. See fig. 22. The output from the second voltage amplifier stage is applied to the 500K-ohm potentiometer R-118. This is the PLAYBACK VOLUME control located on the front panel and used as a monitoring volume control as well as a playback volume control. Terminals 9, 10, 11 and 12 of the wafer switch S-304E determine whether the grid of the output tube is connected to ground (B—) or connected to the output from the second stage. This wafer switch S-304E is the fifth wafer from the front panel of the PLAYBACK-RECORD SELECTOR. In the RECORD position, the wafer switch S-304E connects the grid of the output tube V-102 to the output from the second stage. In the PLAYBACK position, the wafer switch S-304E connects the grid of the output tube V-102 to ground. This eliminates the output stage when the machine is used for playback. The bias for this stage is obtained by the 470-ohm cathode resistor R-119. This resistor is by-passed by the 50-mfd. capacitor C-108. The screen grid and plate receive

their d-c voltage supply through the 12K-ohm plate load resistor R-120. The output from this stage is connected to the magnetic heads E-100, through the .05-mfd. coupling capacitor C-109 and the 47K-ohm attenuation resistor R-122. The a-c magnetic bias from the bias amplifier stage is connected across the magnetic heads E-100. The terminal TB-300F is a screw terminal located on the rear panel and designated REC. HEAD VOLTAGE AMP. 1. This terminal provides a means for easy connection to measure the biasing voltage. Terminals 5, 6, 7 and 8 of the wafer switch S-304C determine whether the magnetic heads E-100 are connected to the output stage or connected to the primary winding of the input transformer T-100. This wafer switch S-304C is the third wafer from the front panel of the PLAYBACK-RECORD SELECTOR. In the PLAYBACK position, the magnetic heads E-100 are connected to the primary of the input transformer T-100. In the RECORD position, the magnetic heads E-100 are connected to this output stage. The magnetic heads E-100, which are located on the mechanical chassis, are connected through slip rings, shielded cords and connectors J-300 and P-300 to the amplifier chassis. The connector J-300 is a polarized 6-contact male connector located on the top of the amplifier chassis. Connector P-300 is a mating 6-contact socket. This output stage has an affiliated 6E5 electron-ray tube V-103. The purpose of this tube V-103 is to give a visual indication of the audio voltage applied to the magnetic heads E-100 while recording. The 6E5 tube is mounted so that its fluorescent target is visible on the front panel and designated on the front panel as RECORD VOLUME AMPLIFIER NO. 1. The target of the 6E5 tube is connected directly to the B supply. The plate of the triode section is connected to the B supply through the 1.2-megohm resistor R-126. The control grid of the 6E5 tube V-103 is connected to the output of the output stage through a resistor-condenser network consisting of 220K-ohm resistor R-123, 47K-ohm resistor R-124, 100K-ohm resistor R-121, .00047-mfd. capacitor C-110, .0047-mfd. capacitor C-111, .0022-mfd. capacitor C-112 and 470K-ohm resistor R-125. The .0047-mfd. capacitor C-111 acts as a blocking capacitor to prevent the d-c rectification voltage of the eye tube from reaching the magnetic heads. The remainder of this resistor-capacitor network is designed to filter or remove the high frequency biasing from the eye tube, to reduce the higher audio frequencies applied to the eye tube and to cause the eye of the tube to close at the proper recording level. As the recording volume increases, the voltage to the control grid of the 6E5 tube increases thus closing the eye. The recording volume should be adjusted so that the peak signal to be recorded just closes the eye of the tube. The description in this paragraph applies to amplifier channel number one. There is an exact duplicate of this circuit for amplifier channel two with the exception of the tone generator circuit. Refer to par. 6*a* (12).

(8) BIAS OSCILLATOR STAGE.—The bias voltage applied to the magnetic heads of both channels is derived from the 6C4 triode tube V-301 connected as an oscillator.

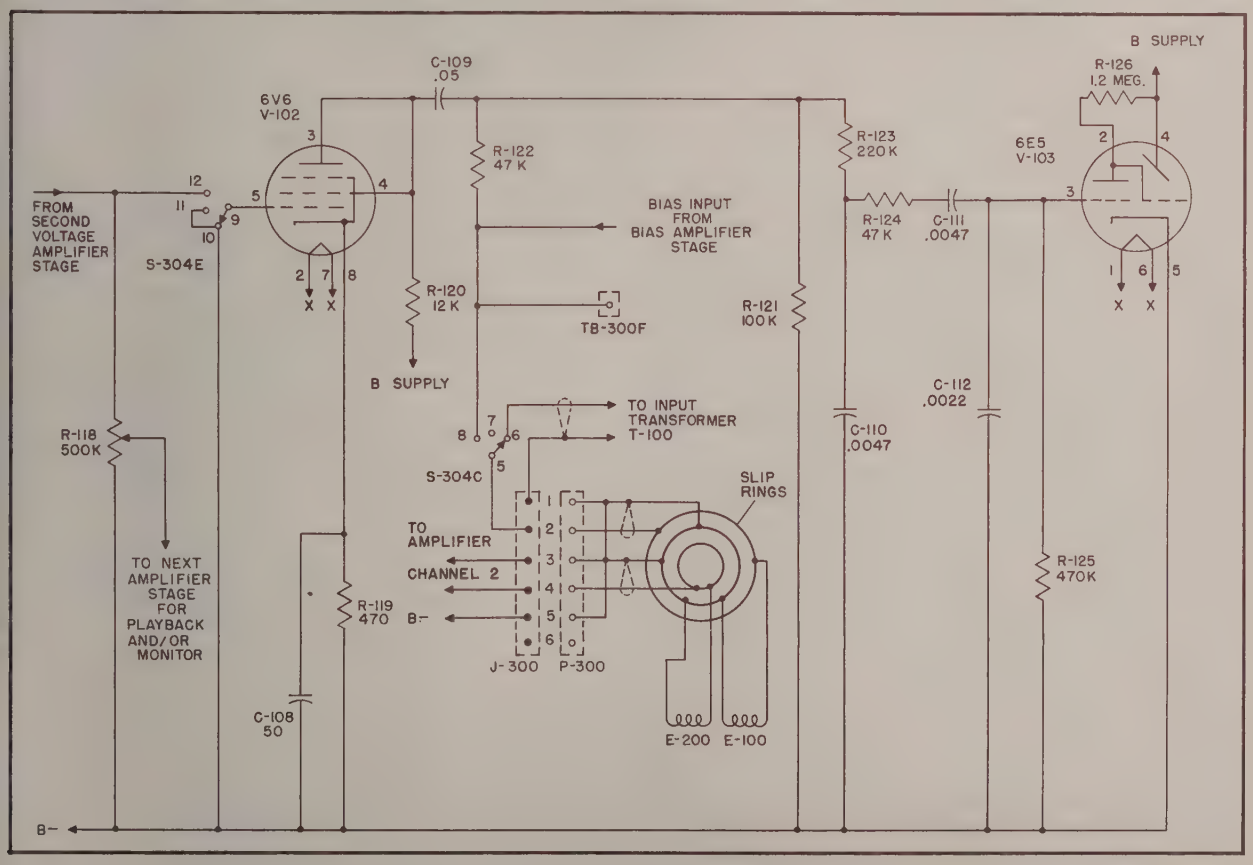


FIG. 22 *Record Output Stage—Circuit Diagram.*

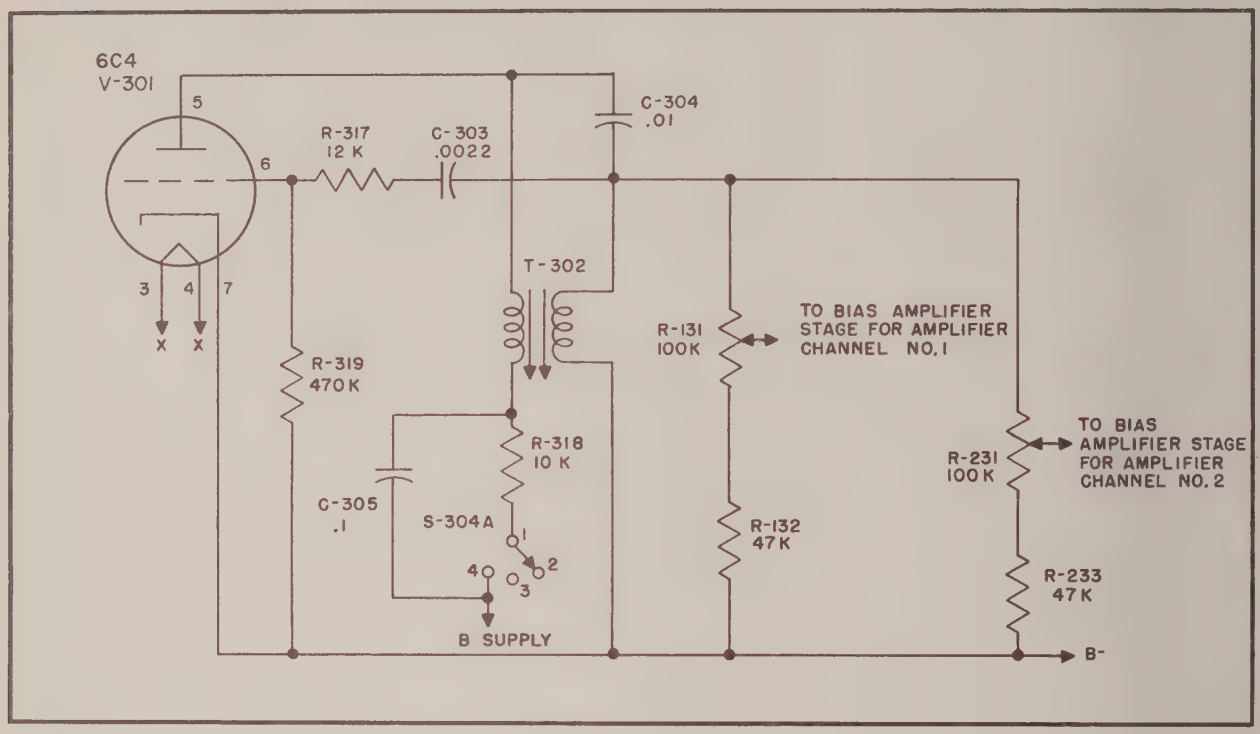


FIG. 23 *Bias Oscillator Stage—Circuit Diagram.*

See fig. 23. The feedback from the plate to the grid of this tube to provide oscillation is obtained by the oscillator coil T-302 through the 12K-ohm resistor R-317 and the .0022-mfd. capacitor C-303. The oscillator coil T-302 has a variable magnetic core to adjust the frequency of oscillation. The oscillator coil T-302 in conjunction with the .01-mfd. tuning capacitor C-304 permits tuning of this oscillator circuit to 20,000 cycles. The plate is connected to the d-c voltage supply through one winding of the oscillator coil T-302, the 10K-ohm resistor R-318 and the wafer switch S-304A. Terminals 1, 2, 3 and 4 of the wafer switch S-304A determine when this oscillator stage is functioning. The wafer switch S-304A is the wafer nearest the front panel of PLAYBACK-RECORD SELECTOR. When the wafer switch S-304A is in the PLAYBACK position, the plate of the tube V-301 is disconnected from the B supply and the tube ceases to oscillate. In the RECORD position, the plate is connected to the B supply and the tube V-301 oscillates. The combination of the .1-mfd. capacitor C-305 that by-pass the wafer switch S-304A and the 10K-ohm resistor R-318 causes the oscillations to build up and die down gradually when the switch is actuated to prevent the magnetic heads from being magnetized by an instantaneous applied voltage. To accomplish this, the switch terminals 1, 2, 3 and 4 of wafer switch S-304A are located further apart so that the magnetic heads, which are switched by terminals 5, 6, 7, 8, 9, 10, 11 and 12 of wafer switch S-304C, are always connected in the RECORD position while oscillations build up and die down when switching from PLAYBACK to RECORD and vice versa. The output from this oscillator is supplied to the oscillator amplifier stage for each amplifier through the 100K-ohm potentiometers R-131 and R-231. These potentiometers are located on the rear panel and designated BIAS VOLTAGE

ADJ. AMP. 1 and AMP. 2. These potentiometers are adjusted so that the bias voltage applied to the magnetic heads of each amplifier is 57 volts r.m.s. measured with vacuum tube voltmeter. The 47K-ohm resistors R-132 and R-233 prevent their respective controls R-131 and R-231 from completely turning off the bias voltage.

(9) BIAS AMPLIFIER STAGE.—The bias amplifier stage is tuned to the frequency of the bias oscillator to obtain sufficient bias voltage from the oscillator stage to the magnetic heads. This stage uses a 12AU7 twin triode tube V-300. See fig. 24. The description in this paragraph applies to amplifier channel one using one of the triode sections. There is an exact duplicate circuit with the exception of the cathode components for amplifier channel two using the second triode section of this tube V-300. The bias for this stage is obtained by the 500-ohm cathode resistor R-316. This resistor is by-passed by the .05-mfd. capacitor C-312. The plate receives its d-c voltage supply through the tuning coil L-100 which has an adjustable magnetic core. This coil is used in conjunction with the fixed .01-mfd. tuning capacitor C-115 to tune the circuit to resonance at the bias frequency to obtain maximum bias voltage at the magnetic heads. The resistor-capacitor network consisting of the 1.5 megohm resistor R-128, the 100K-ohm resistor R-129, the 220K-ohm resistor R-127 and the .00047-mfd. capacitor C-114 is connected to the neon lamp I-100. This neon lamp is located on the front panel and designated as BIAS INDICATION AMPLIFIER NO. 1. The resistor-capacitor network is designed so that the neon lamp I-100 will glow when sufficient bias voltage is applied to the magnetic heads. This provides a visual indication that proper bias voltage is being applied. The .0047-mfd. capacitor C-113 couples this bias amplifier stage to the magnetic heads to give adequate coupling of the bias voltage to the magnetic heads and negligible by-passing of the audio signal through the tuning coil L-100 to ground.

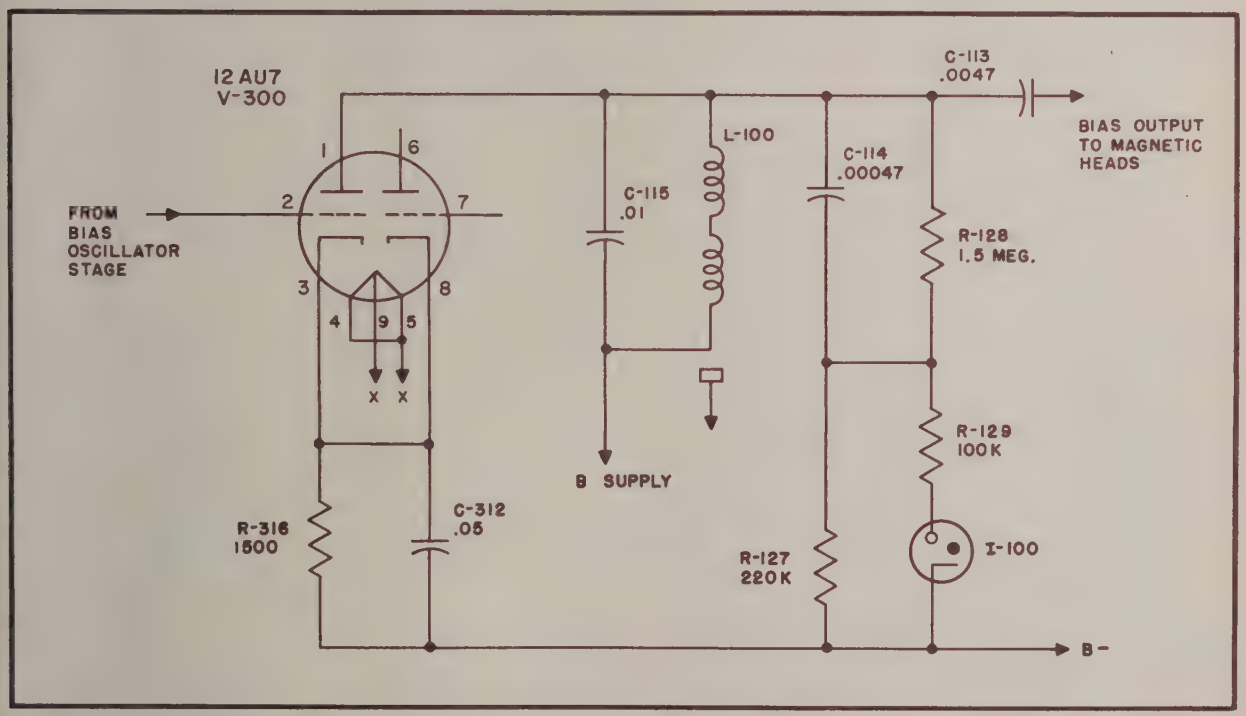


FIG. 24 *Bias Amplifier Stage—Circuit Diagram.*

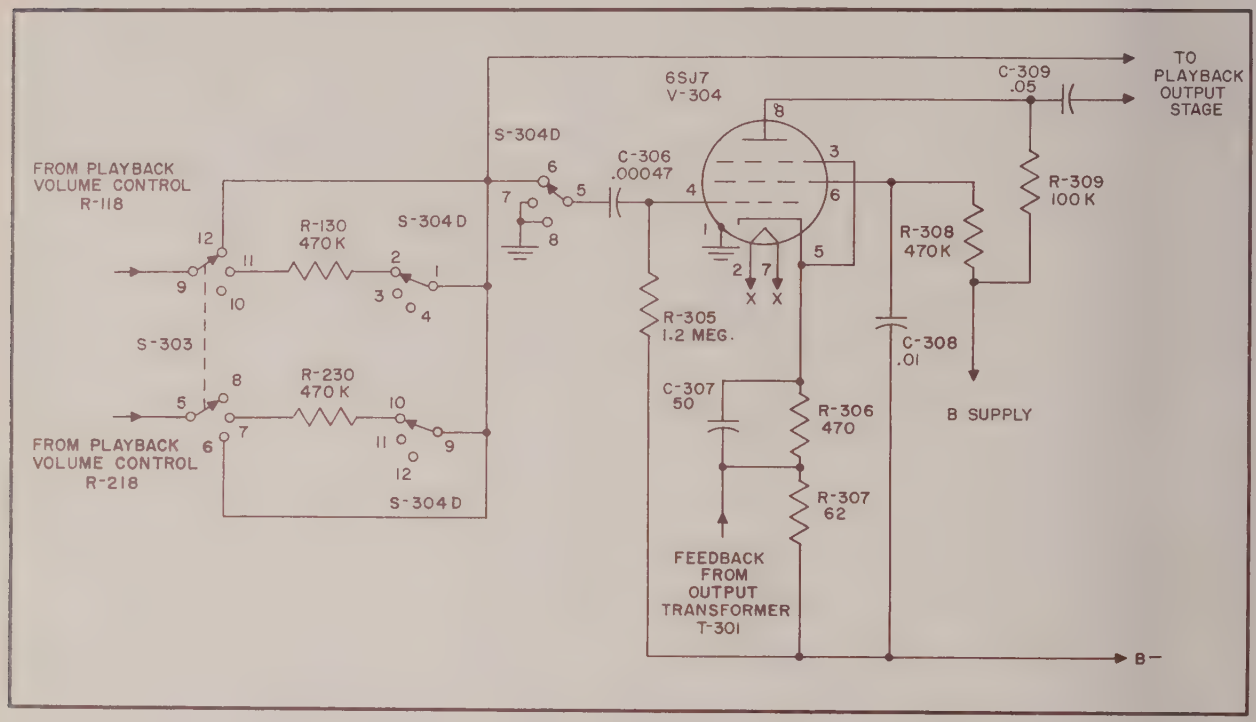


FIG. 25 *Third Voltage Amplifier Stage—Circuit Diagram.*

(10) THIRD VOLTAGE AMPLIFIER STAGE.—The audio output from the PLAYBACK VOLUME controls R-118 and R-218 of each amplifier channel is brought to the wafer switch S-303. See fig. 25. This switch is located on the front panel and designated PLAYBACK CHANNEL SELECTOR. It has three positions designated 1, BOTH and 2. In figure 25 this wafer switch is shown in the 1 position. Terminals 9, 10, 11 and 12 of wafer switch S-303 switch amplifier number 1 in and out of the circuit to the next stage. Terminals 5, 6, 7 and 8 of wafer switch S-303, switch amplifier number 2 in and out of the circuit to the next stage. In the BOTH position, both amplifier channels are connected to the third amplifier stage through the 470K-ohm resistors R-130 and R-230. The terminals 1, 2, 3 and 4, and the terminals 9, 10, 11 and 12 of the wafer switch S-304D, switch the resistors R-130 and R-230 in and out of the circuit. The wafer switch S-304D is the fourth wafer from the front panel on the PLAYBACK-RECORD SELECTOR. In the PLAYBACK position, the resistors R-130 and R-230 are connected in the circuit making it possible to play back the recordings from both amplifier channels at the same time. In the RECORD position, the resistors R-130 and R-230 are disconnected. It is therefore not possible to monitor both recordings at the same time as recording is taking place. The third voltage amplifier stage contains a 6SJ7 pentode tube V-304 connected in a conventional resistance-coupled manner to provide class A amplification. This amplifier stage is only used during playback. This is determined by the terminals 5, 6, 7 and 8 of the wafer switch S-304D. The wafer switch S-304D is the fourth wafer from the front panel on the PLAYBACK-RECORD SELECTOR. In the PLAYBACK position, the grid circuit of the third stage tube V-304 is connected to the output from the volume controls. In the RECORD position, the grid circuit is connected to B— thus making this stage inoperative while recording is taking place. In other words, this stage is not used for monitoring as recording is taking place. The .00047-mfd. capacitor couples the output from the playback volume controls to the grid. This capacitor reduces the level of the frequencies below 400 cycles. The 1.2-megohm resistor R-305 is the grid resistor. The bias for this stage is obtained by the 470-ohm resistor and the 62-ohm resistor R-307 in the cathode circuit. The 470-ohm resistor R-306 is by-passed by the 50-mfd. capacitor C-307. An inverse feedback voltage derived from the output transformer T-301 is applied to the cathode circuit across the 62-ohm resistor R-307. The screen grid receives its d-c voltage supply through the 470K-ohm resistor R-308 and by-passed by the .01-mfd. capacitor C-308. This capacitor reduces the level of the

frequencies below 400 cycles. The plate receives its d-c voltage supply through the 100K-ohm plate load resistor R-309. The output from this stage is coupled to the playback output stage by the .05-mfd. capacitor C-309.

(11) PLAYBACK OUTPUT STAGE.—The playback output stage is also used as an output stage for monitoring. The playback output stage contains a 6V6 beam power amplifier tube V-305 connected in a conventional single-ended manner. See fig. 26. Terminals 5, 6, 7 and 8 of wafer switch S-304E determine the input to the grid of this stage. Wafter switch S-304E is the fifth wafer from the front panel of the PLAYBACK-RECORD SELECTOR. In the PLAYBACK position, the grid is connected to the output of the third amplifier stage. In the RECORD position, the grid is connected to the output from the playback volume controls. The 470K-ohm resistor R-310 is the grid resistor. The bias for this stage is obtained from the 220-ohm cathode resistor R-311. This resistor is by-passed by the 50-mfd. capacitor C-310. Terminals 5, 6, 7 and 8 of the wafer switch S-304B determine the d-c voltage applied to the screen grid. Wafer switch S-304B is the second wafer from the front panel of the PLAYBACK-RECORD SELECTOR. In the PLAYBACK position, the screen grid is connected directly to the d-c supply. In the RECORD position, the screen grid receives its d-c voltage supply through the 12K-ohm resistor R-312. The lowered screen voltage produces lower plate current in this stage in the RECORD position. The output transformer T-301 has a primary winding and two secondary windings. The primary winding, terminals 1 and 2, are connected to the plate and d-c supply in a conventional single-ended manner. The 600-ohm secondary winding, terminals 3 and 4, is a floating winding connected to the phone jack J-303. The phone jack J-303 is located on the front panel and designated 600Ω PLAYBACK AND MONITOR. The 3.2-ohm secondary winding, terminals 5 and 6, is connected to the in-built loudspeaker LS-300 through a switch on the phone jack J-303. Inserting a phone plug in the phone jack J-303 disconnects the speaker and connects the 12-ohm resistor R-315 across the 3.2-ohm output winding. This resistor provides a load on the output transformer T-301 in case a high impedance listening device is plugged into the phone jack J-303. The resistor-capacitor network, consisting of the 7.5K-ohm resistor R-313, the 1K-ohm resistor R-314 and the .25-mfd. capacitor C-311, is connected from the 3.2-ohm secondary winding of the output transformer T-301 to the cathode circuit of the third amplifier stage to provide inverse feedback. This resistor-capacitor network is designed to reduce the high frequency response.

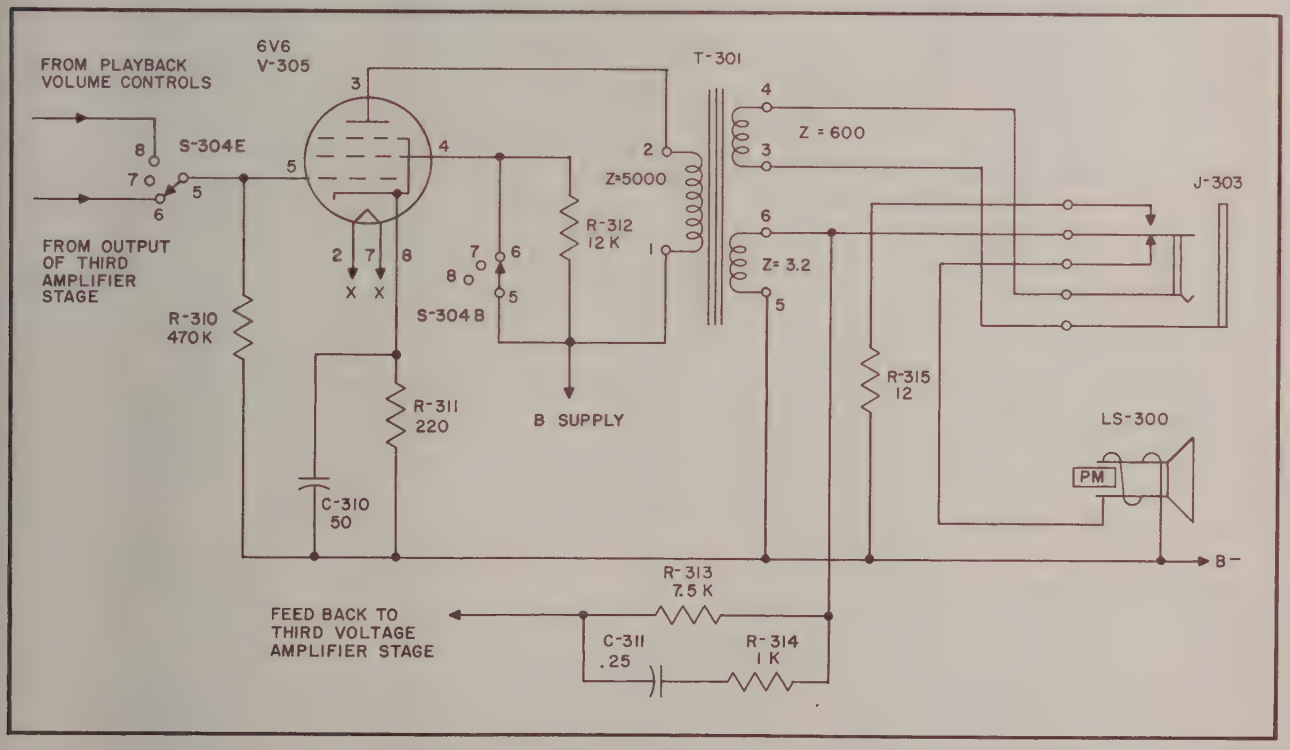


FIG. 26 *Playback Output Stage—Circuit Diagram.*

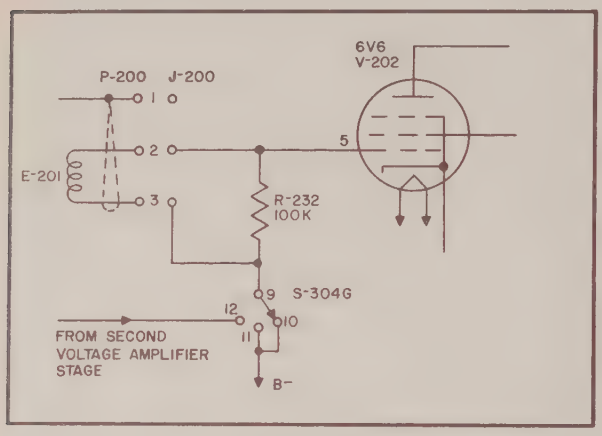


FIG. 26A *Tone Generator—Circuit Diagram.*

(12) TONE GENERATOR.—Tone generator E-201 periodically emits a low level beep tone which is used to identify recordings through amplifier channel two. This tone generator is located on the rear of the mechanical chassis. See fig. 4. The tone generator contains a coil of wire located in a permanent magnetic field. A reed armature, located in an air gap of the permanent magnetic field, is caused to vibrate by a ratchet which is driven by a pulley in contact with the belt drive to the take-up spindle. The reed vibrating in the air gap causes a voltage to be developed in the coil of wire. This voltage is brought to the recording output stage of amplifier channel two (V-202) through shielded cords and connectors P-200 and J-200. See fig. 26A. Connector J-200 is a three-contact female socket mounted on the amplifier chassis and P-200 is its mating three-contact male plug. The voltage is applied across the 100K-ohm resistor R-232 in the grid circuit of the 6V6 output tube V-202.

b. DEMAGNETIZER.—Power is supplied from a wall outlet to the Demagnetizer through the power cord W-400 and its associated connectors P-400 and P-401. See fig. 27. The receptacle J-400 is located on the back of the Demagnetizer. The Demagnetizer is protected by a 10-ampere fuse F-400. The switch S-400 is a normally-off spring-return type toggle switch located at the front of the Demagnetizer. Demagnetization of the magnetic tape is accomplished by placing a reel of recorded magnetic tape in the magnetic field between the pole pieces of the two coils L-400 and L-401. These coils are connected in series with the 12-mfd. capacitor C-400 across the incoming power line. The coils on the iron core, together with the capacitor, comprise a series resonant circuit. Each coil, L-400 and L-401, contains 710 turns of wire with a tap at 650 turns and 675 turns. The connections to the coil are chosen to provide resonance with a given capacitor. This develops a voltage of approximately 900 volts across the capacitor and across the coils thus producing a very strong magnetic field. Refer to par. 11*b* of Section 8. The 22K-ohm resistor R-400 acts as a bleeder resistor to discharge the 12-mfd. capacitor C-400 after the toggle switch S-400 is released to the OFF position. The neon lamp I-400 is located at the front of the Demagnetizer. The 470K-ohm resistor R-401 and the 100K-ohm resistor R-402 connect the neon lamp I-400 so that it glows when the Demagnetizer is operated to indicate sufficient voltage for demagnetization.

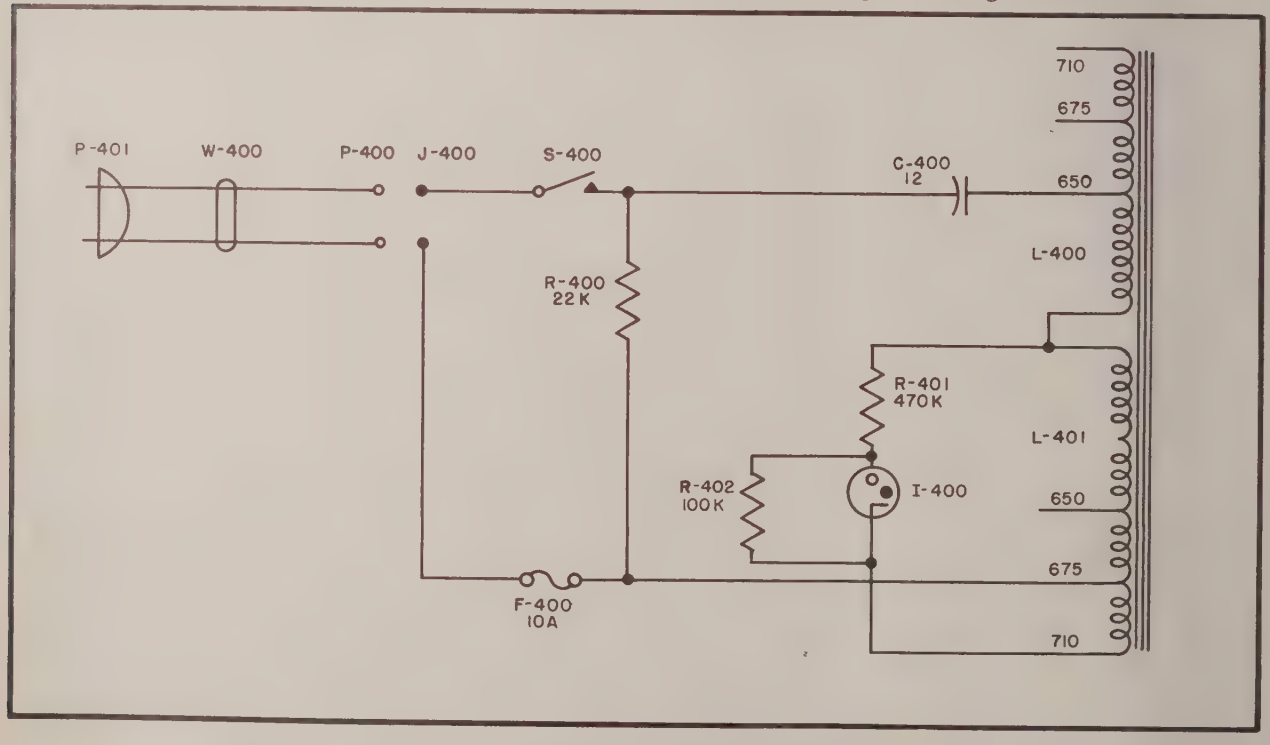
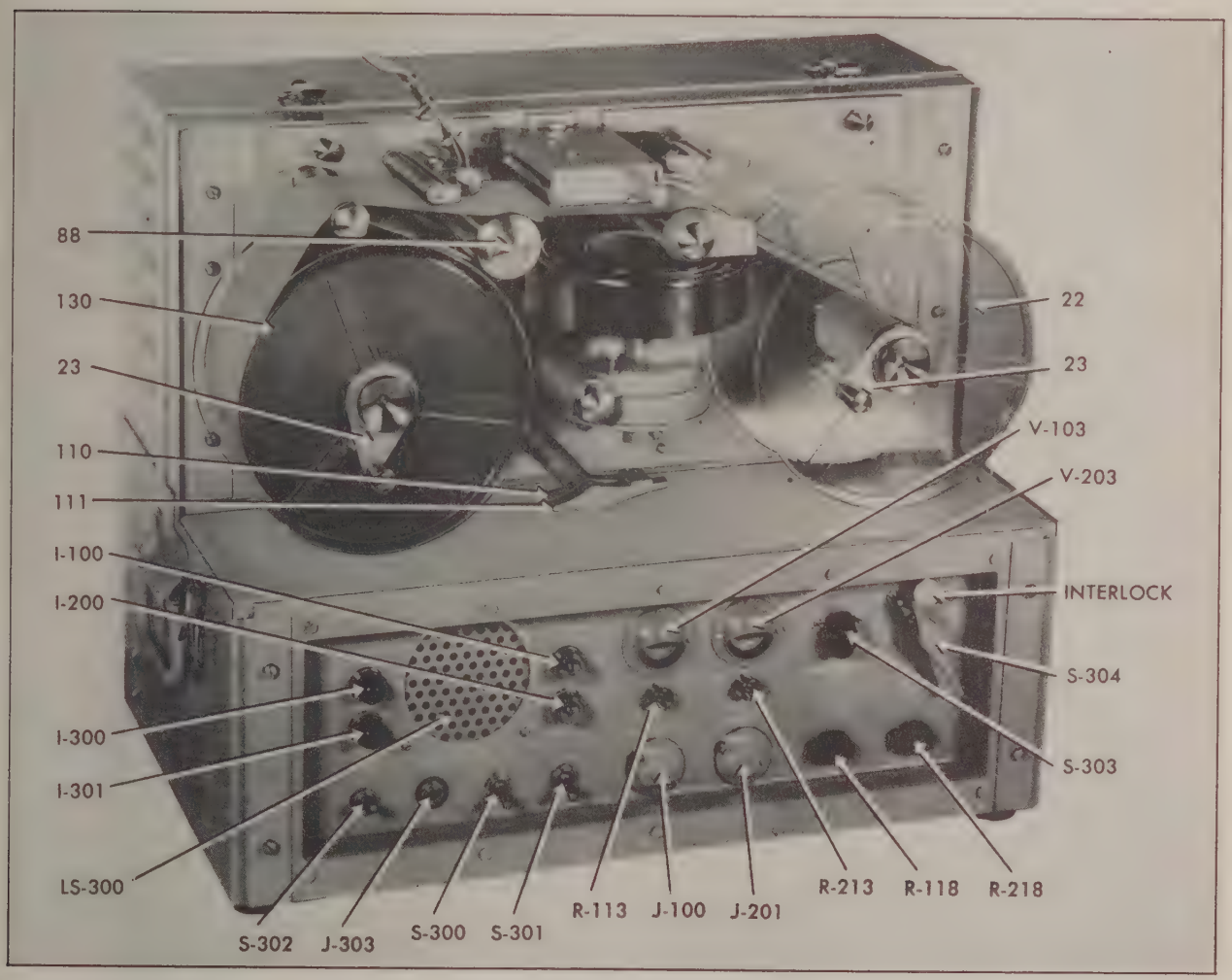


FIG. 27 *Demagnetizer—Circuit Diagram.*

SECTION 6
Operating Instructions



The index numbers refer to Master Drawing S6502H3158804—*Mechanical Assembly.*
FIG. 28 *Controls—Magnetic Tape Loaded for Recording.*

1. TO MAKE RECORDING.

a. Remove front cover by unlatching the four hasps.

b. Remove handle cranks (23) from reel spindles by unscrewing thumb screw. See fig. 28.

c. Place empty reel (22) on right-hand spindle and replace crank (23) making sure that keys seat properly.

d. Similarly place demagnetized reel of magnetic tape (130) on left spindle such that when magnetic tape is pulled from the reel, the reel moves clockwise and replace crank.

e. Rotate LOAD—SCAN control (110) (111) fully clockwise.

f. Thread magnetic tape as shown in fig. 28.

g. Attach end of magnetic tape to hub of empty reel (22) using adhesive tape.

h. Wind magnetic tape on empty reel by turning empty reel clockwise until 0000 appears over guide roller (88).

i. Rotate LOAD-SCAN control (110 and 111) fully counterclockwise.

j. Turn on POWER switch (S-300) located under loudspeaker.

k. Place SELECTOR (S-304) in RECORD position by pressing interlock and pointing bottom of handle toward RECORD.

l. After tubes warm up, adjust screwdriver RECORD VOLUME controls on each channel (R-113 and R-213) such that corresponding eye closes on speech peaks.

m. Mark date and time recording will begin on empty reel (22) with china marking pencil.

n. Turn MOTOR toggle switch (S-301) on at time marked on empty reel (22).

o. Replace cover.

2. ADDITIONAL RECORDING OPERATIONS.

a. TO MONITOR RECORDING.

(1) Place PLAYBACK CHANNEL SELECTOR switch (S-303) in the "1" position. See fig. 28.

(2) Adjust CHANNEL 1 PLAYBACK VOLUME control (R-118) to comfortable level.

(3) Switch PLAYBACK CHANNEL SELECTOR (S-303) to the "2" position.

(4) Adjust CHANNEL 2 PLAYBACK VOLUME control (R-218) to a comfortable level.

(5) Note that, under recording conditions, no signal occurs in the BOTH position of the PLAYBACK CHANNEL SELECTOR (S-303)—this is normal.

b. BIAS INDICATION LAMPS.—Illumination of these lamps (I-100 and I-200) shows that the RECORD-PLAYBACK SELECTOR (S-304) is in the RECORD position and that adequate bias voltage is available on each channel.

c. POWER FAILURE.—Illumination of the red RELOAD WARNING lamp (I-301) and operation of the buzzer before the magnetic tape needs to be reloaded indicates power failure within the machine.

d. RELOAD WARNING.—Illumination of the red RELOAD WARNING lamp (I-301) and operation of the buzzer indicates that the magnetic tape must be reloaded.

e. NORMAL RELOADING.—This procedure provides continuous recording and has the advantage of the time scales on the magnetic tape being closely related to the clock time each day but involves a discontinuity of the recording on the ends of the magnetic tape. Reloading of the magnetic tape requires only a short period of time once every 24 hours and during this time the magnetic tape can be continuously kept in contact with the magnetic heads so that any pertinent data can be recorded during the time consumed for reloading. However, it is advantageous to change the magnetic tape at a time such as midnight or the early morning hours when the traffic of signals to be recorded is lightest. The time 0000 at the beginning of the magnetic tape can be at any time but let us assume it represents 12:00 o'clock midnight. At 11:55 p.m. (1435-mnuite designation on magnetic tape) the buzzer will operate and the RELOAD WARNING lamp (I-301) will glow. At this particular time there is five minutes of recording time left before the end of the 24-hour period. There is, however, sixteen minutes additional recording time with time indications marked on the magnetic tape. The magnetic tape is marked to 1456 minutes which represents 24 hours and 16 minutes. Beyond this there is an additional five feet of magnetic tape used as lead in, that will permit a little more than six minutes of recording time. Follow this procedure to change the magnetic tape.

(1) As soon as possible after the buzzer operates and the red RELOAD WARNING lamp (I-301) glows, the magnetic tape should be changed.

(2) Erase a reel of magnetic tape in the Demagnetizer. Refer to par. 2*g* of Section 6 for operation of the Demagnetizer.

(3) Press down and release the WARNING RESET lever (S-302) to stop the buzzer and shut off the RELOAD WARNING lamp (I-301). See fig. 28.

(4) Watch both RECORD VOLUME eye tubes (V-103 and V-203) for both channels. When no signal is being recorded, hold SCAN lever (111) in a clockwise position with your left hand as you turn right-hand reel (22) clockwise by its handle with your right hand until the 1455 designation on the magnetic tape appears over guide roller (88). Rotate right-hand reel (22) as fast as possible to reduce amount of time consumed in the operation. Then return SCAN lever (111) to its counterclockwise position.

NOTE

If a message to be recorded comes in during the time the magnetic tape is being wound on reel (22) immediately return the SCAN lever (111) to its counterclockwise position and the message will be recorded.

(5) Rotate left-hand reel (130) clockwise until the five feet of lead-in magnetic tape is unwound from the reel. Disconnect the magnetic tape from the hub of reel by releasing the adhesive tape. Also remove this adhesive tape from the magnetic tape.

(6) Remove empty left-hand reel from spindle.

(7) Place sound-erased reel of magnetic tape on left-hand spindle such that when magnetic tape is pulled from the reel, the reel moves clockwise. Be sure to replace crank handle (23).

(8) Lay magnetic tape which is feeding through the machine with its paper (back) side up. Place the end of magnetic tape that is on left-hand reel on top of the magnetic tape feeding through machine. Overlap the magnetic tapes a few inches and fasten them together with adhesive tape. Be sure the adhesive tape is smoothly applied to the magnetic tape. The magnetic tapes should now appear as shown in fig. 29.

(9) Again, watch both RECORD VOLUME eye tubes (V-103 and V-203) for both channels. See fig. 28. When no signal is being recorded, hold SCAN lever (111) in a clockwise position with your left hand as you turn the right-hand reel (22) clockwise by its handle with your right hand until the spliced joint of the magnetic tapes is just on top of the right-hand reel (22). Rotate the right-hand reel as fast as possible to reduce the amount of time consumed in the operation. Then return SCAN lever (111) to its fully counterclockwise position.

NOTE

If a message to be recorded comes in during the time the magnetic tape is being wound, immediately return SCAN lever (111) to its counterclockwise position and the message will be recorded.

(10) Write the time and date on the right-hand reel (22) with the china marking pencil, for example: "Ended 11:59 P.M.—Feb. 2".

(11) Unfasten end of magnetic tape feeding through machine from magnetic tape now on the right-hand reel.

(12) Fasten the end of the magnetic tape on the right-hand reel with adhesive tape.

(13) Remove full reel of recorded tape from the right-hand spindle.

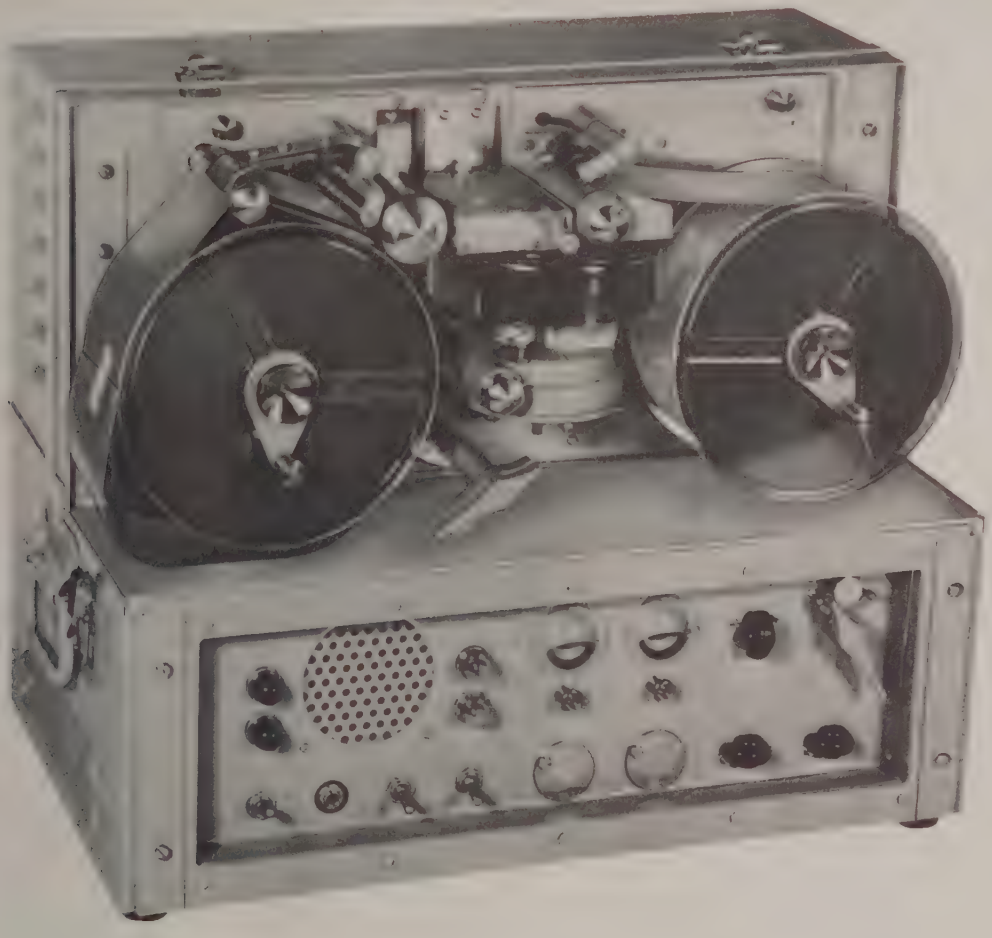


FIG. 29 *Magnetic Tape Loaded for Continuous Recording.*

(14) Load empty reel on the right-hand spindle.

(15) Fasten magnetic tape to hub of the right-hand reel with adhesive tape.

(16) Note the time and watch both RECORD VOLUME eye tubes (V-103 and V-203) for both amplifier channels. When no signal is being recorded, hold SCAN lever (111) in a clockwise position with your left hand as you turn the right-hand reel clockwise by its handle with your right hand until the time designation on the magnetic tape that agrees with the clock time appears over the guide roller (88). For example, if it is 12:01 the time indication 0001 on the magnetic tape should appear over the guide roller (88). Rotate the hight-hand reel as fast as possible to reduce the amount of time consumed in the operation. Then return the SCAN lever (111) to its fully counterclockwise position. Write this time and the date on the side of the empty right-hand reel with the china marking pencil: "Started 0001—12:01 A.M.—Feb. 3".

NOTE

If a message to be recorded comes in during the time the magnetic tape is being wound, immediately return SCAN lever (111) to its counterclockwise position and the message will be recorded.

(17) The machine is now reloaded and ready for another 24 hours of continuous recording. Any recording that has taken place between the time 11:55 P.M. (1435) when the buzzer operated and 11:59 P.M. will be on the magnetic tape that has been removed somewhere between the 1435 indication on the magnetic tape and the end of the magnetic tape. Any recording that has taken place between the end time 11:59 P.M.—Feb. 2 and the starting time of the new reel of magnetic tape 12:01 A.M.—Feb. 3 will be on the new reel of magnetic tape anywhere from the beginning of the magnetic tape and the time indication 0001 on the magnetic tape.

f. RELOADING FOR CONTINUOUS RECORDING. —This procedure has the advantage of continuous continuity of the recording on the magnetic tape but each day the time reference on magnetic tape must be referenced to the clock time and the time of day when the magnetic tape requires changing will change each day. Follow this procedure to change the magnetic tape for continuous recording.

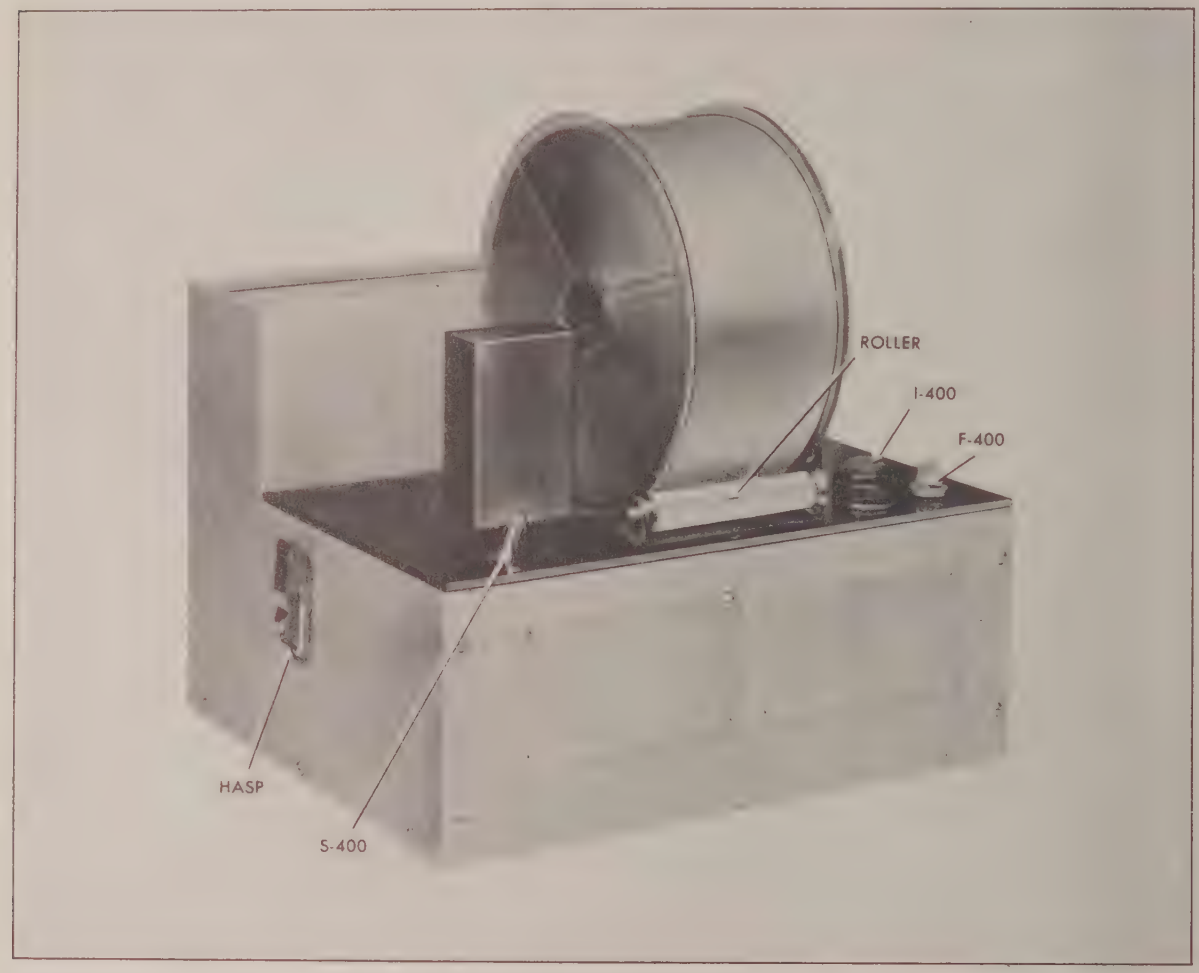


FIG. 30 *Controls—Demagnetizer.*

(1) When the buzzer operates and the red RELOAD WARNING lamp (I-301) glows, press down the WARNING RESET lever (S-302).

(2) Erase a reel of tape in the Demagnetizer. Refer to par. 2*g* of Section 6 for operation of the Demagnetizer.

(3) When the 1456 time designation on the magnetic tape appears over guide roller (88), rotate left-hand reel (130) clockwise until the five feet of lead-in magnetic tape is unwound from the reel. Disconnect the magnetic tape from the hub of reel by releasing the adhesive tape and also remove the adhesive tape from the magnetic tape.

(4) Remove left-hand reel from spindle.

(5) Place sound-erased reel of magnetic tape on left-hand spindle such that when magnetic tape is pulled from the reel, the reel moves clockwise. Be sure to replace crank handle (23).

(6) Lay magnetic tape which is feeding through the machine with its paper (back) side up. Place end of magnetic tape that is on left-hand reel on top of the magnetic tape feeding through machine. Overlap the magnetic tapes a few inches and fasten them together with adhesive tape. Be sure the edges of the magnetic tape line up and the adhesive tape is smoothly applied to the magnetic tape. The magnetic tapes should now appear as shown in fig. 29.

(7) When the end of the magnetic tape on the right-hand reel just passes the guide roller (88) note the time and write this on the right-hand reel, for example: "Ended 2:15 P.M.—Feb. 3".

(8) When the spliced joint of the magnetic tapes is on top of the right-hand reel, unfasten the adhesive tape and fasten the end of the magnetic tape on the right-hand reel.

(9) Remove the full reel of recorded tape from the right-hand spindle.

(10) Load an empty reel on the right-hand spindle.

(11) Fasten magnetic tape to hub of right-hand reel with adhesive tape.

(12) Write on empty reel the time started which is the same time as when the last reel ended, for example: "Started 2:15 P.M.—Feb. 3".

(13) At some time when time indications start to appear over guide roller (88), write a clock reference on the right-hand reel, for example: "0002 is 2:23 P.M."

(14) The machine is now reloaded and ready for an additional 24 hours of recording.

g. ERASURE.

(1) Remove top cover of Demagnetizer by unlatching the four hasps.

(2) Hold POWER ON-OFF switch (S-400) in the ON position. See fig. 30.

CAUTION

Do not set a delicate instrument, such as a watch, between the pole pieces, when the POWER ON-OFF switch is ON.

(3) Set reel of tape on rollers so that it is between pole pieces.

(4) Rotate reel of tape three complete revolutions.

(5) Lift out reel of magnetic tape.

(6) Release POWER ON-OFF switch (S-400).

(7) Complete operations should take about ten seconds.

NOTE

To obtain proper erasure, the lamp I-400 must be lit when the POWER ON-OFF switch is ON and the reel of magnetic tape must be removed from the Demagnetizer while the POWER ON-OFF switch is held ON.

3. TO PLAY BACK.

a. Remove front cover.

b. Remove handle cranks (23) from reel spindles by unscrewing thumb screw. See fig. 31.

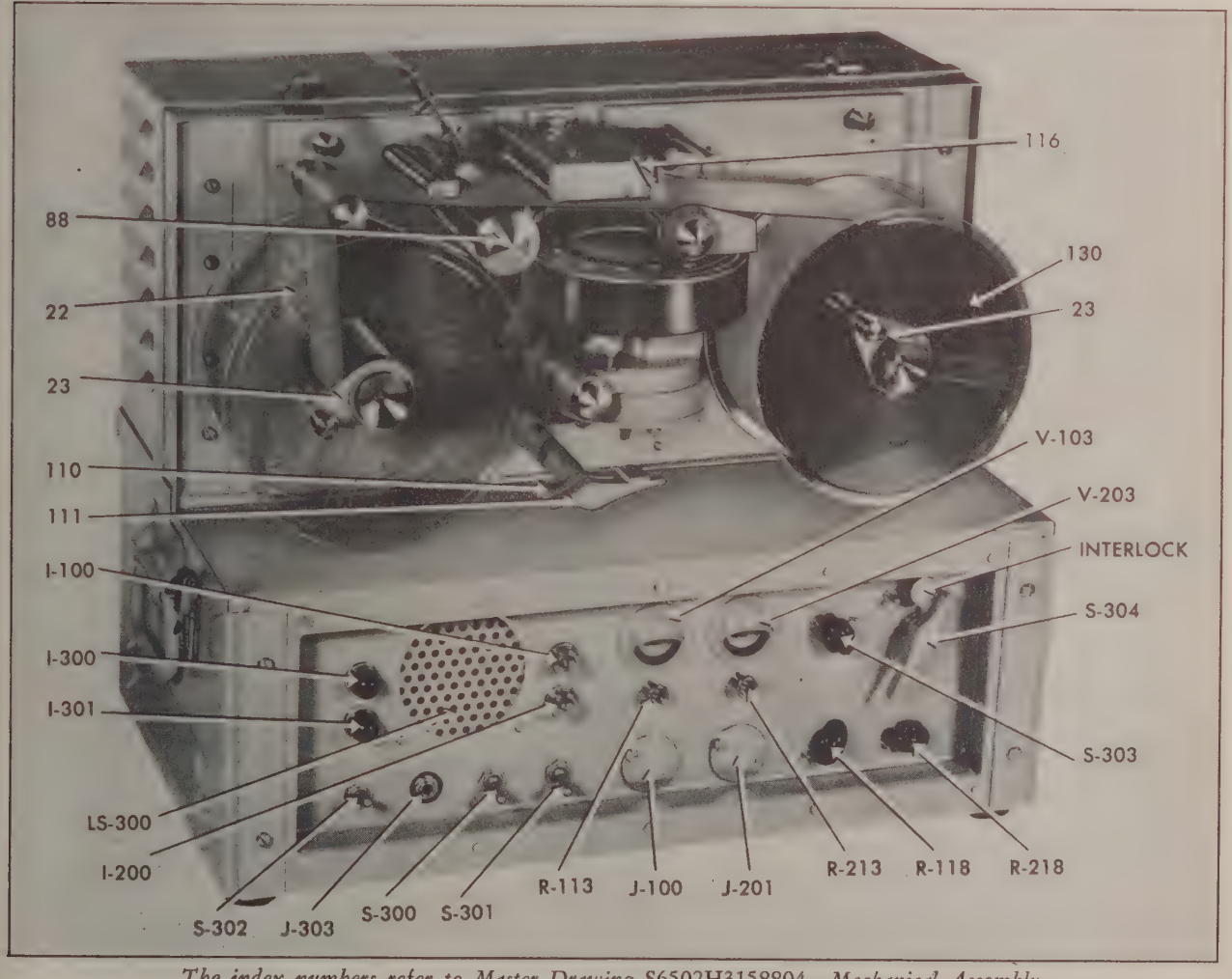
c. Place empty reel (22) on left-hand spindle and replace crank (23) making sure that keys seat properly.

d. Similarly place recorded reel of tape (130) on right-hand spindle such that when magnetic tape is pulled from the reel, the reel moves counterclockwise and replace crank.

e. Rotate LOAD-SCAN control (110 and 111) fully clockwise.

f. Thread magnetic tape as shown in fig. 31.

g. Attach end of magnetic tape to hub of empty reel using adhesive tape.



The index numbers refer to Master Drawing S6502H3158804*—Mechanical Assembly.*

FIG. 31 *Controls—Magnetic Tape Loaded for Playback.*

FIG. 32 *Cutting Magnetic Tape.*

h. Wind magnetic tape on empty reel by rotating empty reel counterclockwise until the time indication at which it is desired to listen appears over guide roller (88).

i. Place SELECTOR (S-304) in PLAYBACK position by pressing interlock and pointing bottom of handle toward PLAYBACK.

j. Rotate LOAD-SCAN lever control (110 and 111) fully counterclockwise.

k. Turn on POWER switch (S-300) located under loudspeaker.

l. Place PLAYBACK CHANNEL SELECTOR switch (S-303) in the "2" position.

m. After the tubes warm up, turn MOTOR toggle switch (S-301) on.

n. Adjust CHANNEL 2 PLAYBACK VOLUME control (R-218) to a comfortable level.

o. Adjust the tuning lever (116) back and forth to a position where the playback signal is the loudest. This is similar to tuning a radio dial. Listen for low level periodic tone that identifies recording on channel two. If identifying tone cannot be heard, move the tuning lever (116) in either direction to next sound track. The recording with the low level periodic tone signal is the recording of channel two.

p. Place PLAYBACK CHANNEL SELECTOR switch (S-303) in the "1" position.

q. Adjust CHANNEL 1 PLAYBACK VOLUME control (R-118) to comfortable level.

r. To listen to both channels at the same time, place the PLAYBACK CHANNEL switch (S-303) in the BOTH position. Under this condition the two volume controls (R-118 and R-218) are used to mix the signals as desired.

4. SPLICING.

a. Overlap the ends of the magnetic tapes that are to be spliced together.

b. Line up edges of magnetic tapes.

c. Cut magnetic tapes at a 60 degree angle using a razor blade and straight edge. See fig. 32. Be sure that the razor blade and straight edge are not magnetized.

d. Align both ends of magnetic tape with uncoated side up.

e. Cover aligned ends of magnetic tape with splicing tape. Splicing tape should protrude over edges of magnetic tape. Do not stretch splicing tape when it is applied because it will cause magnetic tape to curl. Two rolls of splicing tape are supplied in the Maintenance Kit.

f. Apply pressure to splicing tape by rubbing with a smooth surface such as the top of your finger or thumb nail.

g. Remove excess splicing tape by cutting with a pair of scissors. Cut into the magnetic tape a little bit. Be sure that the scissors are not magnetized.

h. If a length of magnetic tape is to be cut out from a reel of magnetic tape, an equal length should be spliced in place to make the time scale on the back of the magnetic tape as accurate as possible.

5. COPYING.

a. Operate the machine on which the copy is to be made as described in par. 1*a* through *l* of Section 6.

b. Operate the machine from which copy is to be made as described in par. 3*a* through *l* of Section 6.

c. Place PLAYBACK CHANNEL SELECTOR (S-303) on the machine which is to copy in the 1 position.

d. Turn on MOTOR toggle switch (S-301) on machine that is used for playback.

e. Adjust CHANNEL 2 PLAYBACK VOLUME control (R-218) on machine used for playback in conjunction with CHANNEL 1 PLAYBACK VOLUME control (R-118) on machine used for recording to provide a comfortable listening volume on the machine used for recording.

f. On the machine that is used for playback, adjust the tuning lever (116) back and forth to a position where signal is the loudest. This is similar to tuning a radio dial. Listen for low level periodic tone that identifies recording on channel two. If identifying tone cannot be heard, move the tuning lever (116) in either direction to next sound track. The recording with the low level periodic tone signal is the recording of channel two.

g. On the machine that is to copy, adjust the screwdriver RECORD VOLUME control R-113 such that the corresponding eye closes on signal peaks.

h. On the machine that is to copy, turn on the MOTOR ON-OFF switch (S-301) when the time indication at which it is desired to start copying appears over the guide roller (88) on the machine that is used for playback.

i. On machine that is used for playback, adjust the tuning lever (116) when necessary, to always give loudest signal.

j. It is only possible to copy one channel at a time. This procedure explains the technique for copying channel two. This same procedure applies to copying channel 1 except between pars. *f* and *g*, place the PLAYBACK CHANNEL SELECTOR (S-303) on the machine used for playback in the 1 position and adjust the AMPLIFIER 1 PLAYBACK VOLUME control (R-118) on the machine used for playback to a comfortable listening volume on the machine used for recording.

k. When copying is completed turn off both machines and remove the reels of tape.

SECTION 7
Preventive Maintenance

1. CARE OF MAGNETIC TAPE.

a. The magnetic tape is wound on a plastic reel and supplied in a cardboard carton. Keep the magnetic tape wound on reels. Keep the reels of magnetic tape stored away from excessive temperatures and humidity.

b. Handle magnetic tape carefully when unwinding from the reels to prevent tearing.

c. When proper care is taken, the magnetic tape will last indefinitely.

2. CARE OF RECORDER-REPRODUCER.

a. Be sure the machine is turned OFF when not in use.

b. Be sure the power source is 118 volts, 60 cycles before plugging in the machine. Any other power source may cause damage.

c. Keep the front cover on the machine, even during operation, to prevent dust and dirt from collecting on the magnetic tape and rotating components. Whenever a magnetic tape is loaded on the machine, wipe the dust off the top of the recording head turntable with the dust brush supplied.

3. CARE OF DEMAGNETIZER.

a. Be sure the power source is 118 volts, 60 cycles before plugging in the Demagnetizer. Any other source may cause damage.

b. Keep the top cover on the Demagnetizer to prevent dust and dirt from collecting in the storage compartment. Occasionally dust out the aperture for the reel of magnetic tape with the dust brush supplied.

c. Do not let any tools or similar items lay in the aperture for the reel of magnetic tape.

4. ROUTINE MAINTENANCE CHECK LIST.

The following Routine Maintenance Check List is a listing of the items that should be checked on each Recorder-Reproducer unit that is being used for continuous recording.

ROUTINE MAINTENANCE CHECK LIST

What to Check	How to Check	When to Check
Power on lamp I-300.	Visually. Should glow when machine operating.	Daily
RELOAD WARNING LAMP I-301 and buzzer.	Visually and audibly. RELOAD WARNING LAMP should glow and buzzer operate only when magnetic tape requires changing. If RELOAD WARNING LAMP glows and buzzer operates before the end of the magnetic tape is reached, it indicates power failure within the machine.	Daily
Feed of magnetic tape.	Visually. Magnetic tape should slowly feed from left-hand reel to right-hand reel past the turntable of magnetic head. Be sure LOAD lever and SCAN lever are in their fully counterclockwise positions.	Daily
Rotation of turntable of magnetic heads.	Visually.	Daily
BIAS INDICATION lamps I-100 and I-200.	Visually. Both lamps should glow.	Daily
RECORD VOLUME AMPLIFIER NO. 1, R-113.	Place PLAYBACK CHANNEL SELECTOR S-303 in the 1 position. Adjust PLAYBACK VOLUME CHANNEL NO. 1 R-118 to comfortable listening volume. The signal being recorded on amplifier channel one should be heard in the loudspeaker. This signal should be blinking the eye tube V-103. Adjust RECORD VOLUME AMPLIFIER NO. 1 R-113 so that the peak signal just closes the eye of the tube V-103.	Daily
RECORD VOLUME AMPLIFIER NO. 2, R-213.	Place the PLAYBACK CHANNEL SELECTOR S-303 in the 2 position. Adjust PLAYBACK VOLUME CHANNEL NO. 2 R-218 to comfortable listening volume. The signal being recorded on amplifier channel two should be heard in the loudspeaker. This signal should be blinking the eye tube V-203. Adjust RECORD VOLUME AMPLIFIER NO. 2 R-213 so that the peak signal just closes the eye of the tube V-103.	Daily

ROUTINE MAINTENANCE CHECK LIST

WHAT TO CHECK	HOW TO CHECK	WHEN TO CHECK
Reel of recorded magnetic tape.	Playback reel of recorded magnetic tape on a machine that is not being used for recording to check overall recording results. Periodic test signals can be recorded and these tests played back when the magnetic tape is removed from the machine.	Semi-Weekly
Height of pressure gate.	Visually. Adjust if necessary according to par. 10 *i* of Section 8.	Monthly
Lubrication.	Lubricate as outlined in par. 5 of Section 7.	Semi-Yearly
Flexible coupling.	Visually. Replace if damaged. Refer to par. 9*a* (6) of Section 8.	Semi-Yearly
Turntable of magnetic heads.	Replace. Refer to par. 9*a* (7) of Section 8.	Semi-Yearly
Pressure Rollers.	Visually. Replace if worn excessively. Refer to par. 9*a* (20) of Section 8.	Semi-Yearly
Clutch tension of take-up spindle.	Refer to par. 10*a* of Section 8.	Semi-Yearly
Clutch tension of feed spindle.	Refer to par. 10*c* of Section 8.	Semi-Yearly
Spring tension on tape shoe.	Refer to par. 10*f* of Section 8.	Semi-Yearly
Line-up of reels.	Refer to par. 10*g* of Section 8.	Semi-Yearly
Wear on guide washers.	Refer to par. 10*e* of Section 8.	Semi-Yearly
Brush contacts.	Refer to par. 11*a* (1) of Section 8.	Semi-Yearly
Drive belt to take-up spindle.	Replace if badly frayed. Refer to par. 10*b* of Section 8.	Semi-Yearly
Tubes and pilot lamps.	Replace all tubes and pilot lamps. Refer to par. 6 of Section 8.	Semi-Yearly
Bias voltage.	Refer to par. 11*a* (2) of Section 8.	Semi-Yearly
Amplifier gain, power output and frequency response.	Refer to par. 8 of Section 8.	Semi-Yearly

5. LUBRICATION.

a. There are two types of lubricant required to lubricate the moving components in the Type RD-115/UN Sound Recorder-Reproducer. An oil such as Gulf Oil Corp. GULFCREST OIL A, or Standard Oil Co. No. 12612, is required to lubricate the components requiring oiling. These oils conform to the General Electric Corp. specification D50F89. Any oil corresponding to Navy Symbol 2075 and/or 2075-H may be used. A grease such as "petrolatum" is required for the components requiring greasing.

b. The following components require lubrication:

(1) Remove the motor as described in par. 9*a* (5) of Section 8.

(2) Oil both the front and rear bearings of the motor with two drops of oil in each bearing. See fig. 43.

(3) Check grease on the worm shaft. There should be a light film of grease covering the worm and shaft. This worm shaft and grease must be absolutely clean, free of dirt and any metal particles. If not clean, wash off grease and apply new grease. See fig. 43.

(4) Apply one drop of oil on each end and between rubber rollers of pressure feed roller. Do not get oil on rubber rollers. See fig. 49.

(5) Apply a light film of oil with a small pencil brush to the ways of the pressure gate. See fig. 47.

(6) Apply a drop of oil to the bearing of the idler pulley, a drop of oil to the bearing of the idler gear, and a drop of oil to the pulley shaft of tone generator. Do not get oil on belt. See fig. 50.

SECTION 8
Corrective Maintenance

1. GENERAL TROUBLE SHOOTING INFORMATION.

a. The first step in trouble shooting is to sectionalize the fault. Sectionalization means a general localization of the fault. The second step is to localize the fault to the defective part responsible for the abnormal condition. Some faults, such as mechanical and burned out resistors, can be located by sight or smell. Some faults, however, must be located by meter measurements.

b. All the faults that may occur in the Type RD-115/UN Sound Recorder-Reproducer and the Type MX-1373/UN Demagnetizer can be found by resistance measurements, voltage measurements, grounding tests and sensitivity tests.

c. All voltages and resistances can be measured with a volt-ohmmeter having a 20,000 ohm per volt characteristic, except the magnetic bias voltage which requires a vacuum tube voltmeter for an accurate reading. However, this biasing voltage is not critical and there is a neon lamp in the circuit of each bias amplifier stage which glows when there is sufficient voltage applied. The meter used for testing should be capable of measuring a-c voltages from 0 to 1000 volts, d-c voltages from 0 to 500 volts, and resistances from 0 to 1 megohm. The higher the internal resistance of the meter, the more accurate the readings will be.

d. Grounding tests can be made as a simple means of tracing hum troubles. If hum occurs in one of the amplifiers, short the grids of the tubes one at a time to B— while listening to determine in which stage the hum is being introduced. Start with the grid of the first stage, then the second stage, etc. When the hum stops, this indicates the trouble to be in the stage immediately preceding the first grounded grid which stops the hum.

e. Sensitivity tests can be made as a simple means of locating a dead stage. Test the grids of each stage by touching the grid terminal of the tube socket with a screwdriver blade grounded to your body until one is found that will produce a hum or click. This indicates the dead stage is the one immediately preceding the first grid which is sensitive. The volume controls should be turned on full when this test is made.

2. HINTS ON SECTIONALIZING AMPLIFIER TROUBLE.

a. Before trouble shooting, test all the tubes by a tube tester or replace the tubes with a known good set to eliminate possible tube trouble.

b. If both recording amplifier channels are operating properly and it is not possible to monitor or play back, the trouble must be in the components common to monitor and playback. These components are the output stage containing 6V6 tube V-305, output transformer T-300 and output circuit to loudspeaker LS-300 and phone jack J-303.

c. If both recording and monitoring amplifier channels are operating properly and it is not possible to play back, the trouble must be in the components used only for playback. These components are in the third voltage amplifier stage containing the 6SJ7 tube V-304.

d. If one amplifier channel records properly and both amplifier channels monitor and play back properly but the second amplifier channel does not record properly, the trouble must be in the output stage containing the 6V6 tube V-102 or V-202 or the bias amplifier stage containing the 12AU7 tube V-300A or V-300B of the amplifier channel that is deective.

e. If both amplifier channels monitor and play back properly but both recording amplifier channels do not record, the trouble must be in the bias oscillator stage containing the 6C4 tube V-301 or the bias amplifier stage containing the 12AU7 tube V-300.

f. If one amplifier channel records, monitors and plays back properly but the second amplifier channel does not record, monitor or play back, the fault must be in the input circuit including the magnetic heads or in the first two amplifier stages of the defective amplifier.

g. If neither amplifier channel records, monitors or plays back, the fault must be in the power supply which is common to both amplifiers.

3. HINTS ON LOCALIZING AMPLIFIER TROUBLE.

a. HUM.—If hum occurs in one of the amplifiers, short circuit the grids to B— to determine in which stage the hum is being introduced. Refer to par. 1*d* of Section 8.

b. OPEN CATHODE BY-PASS CAPACITOR.—An open cathode by-pass capacitor causes hum and decreases the amplification of the stage causing a weak amplifier. The best method of checking the suspected capacitor is to shunt another capacitor across it and note the effect.

c. LOW SCREEN OR PLATE VOLTAGE.—Low screen or plate voltage causes the amplifier to be weak. This type of fault can be localized by resistance and voltage measurements. Low screen or plate voltage can be caused by positive voltage on the grid or no cathode voltage.

d. OPEN COUPLING CAPACITOR.—When a coupling capacitor between the plate of one stage and the grid of the next stage opens, the amplifier is blocked or does not produce any sound. This can be localized by a sensitivity test as described in par. 1*e* of Section 8. Check the suspected capacitor by shunting another across it and note the effect.

e. SHORTED COUPLING CAPACITOR.—When a coupling capacitor between the plate of one stage and the grid of the next stage shorts out or leaks, it causes hum and makes the amplifier weak. This can be localized by a d-c voltage reading appearing on the grid. The defective capacitor must be replaced.

f. OPEN GRID CIRCUIT.—An open grid resistor or grid circuit will cause hum. An open grid circuit can be localized by a grounding test and checked by resistance measurement. Refer to par. 1*d* of Section 8.

g. OPEN TRANSFORMER.—An open transformer will render the amplifier inoperative. This can be localized by resistance measurements.

b. SHORTED TRANSFORMER.—Shorted turns on a transformer winding will cause the amplifier to be weak, or inoperative. This can be localized by resistance measurements.

4. TROUBLE SHOOTING CHART.

Figure 33 is a Trouble Shooting Chart for the Recorder-Reproducer. This chart provides a general step-by-step procedure for sectionalizing and localizing trouble. This chart assumes that all associated wiring is checked and repaired and that all tubes have been checked by a tube tester and the defective tubes replaced with known good tubes.

5. FUSE REPLACEMENT.

a. RECORDER-REPRODUCER.—Failure of the POWER ON lamp I-300, BIAS INDICATION LAMPS I-100 and I-200, and RECORD VOLUME eye tubes V-103 and V-203 during recording is an indication of fuse failure. The fuse is a three ampere, 250-volt fuse located in a screw type holder on the rear panel.

b. DEMAGNETIZER.—Failure of the POWER ON lamp I-400 when the POWER ON-OFF switch S-400 is held in the ON position is an indication of fuse failure. The fuse is a 10-ampere, 250-volt fuse located in a screw type holder at the front of the Demagnetizer.

WARNING

Never replace a fuse with one of higher rating unless continued operation of the equipment is more important than probable damage. If a fuse burns out immediately after replacement, do not replace it a second time until the cause has been corrected.

6. TUBE REPLACEMENT.

Tube replacement in the amplifier chassis of the Recorder-Reproducer unit requires removal of the amplifier chassis. Refer to par. 9*a* (4) of Section 8 to remove the amplifier chassis from the cabinet. Figure 34 shows the tube location within the amplifier chassis. The 6SJ7 tubes, V-100, V-101, V-200, V-201 and V-304 are held in place by semicircular brackets. These brackets are held to the chassis by a screw. To replace one of these tubes, the screw holding the bracket must be loosened, the bracket moved out of the way, the tube pulled out of its socket, a replacement tube plugged into the socket and the bracket replaced. The 5Y3 tube V-303 and the 6V6 tubes V-102 and V-305 are held in place by a snap type circular clamp. To replace one of these tubes, the snap on the clamp must be released, the tube pulled out of its socket, a replacement tube plugged into the socket and the snap-on clamp fastened. The 6V6 tube V-202 and 5Y3 tube V-302 are held in place by circular brackets fastened to the side of the chassis by screws. To replace any of these tubes, the bracket must be removed, the tube pulled out of its socket, a replacement tube plugged into the socket and the bracket replaced. The 12AU7 tube V-300 and the 6C4 tube V-301 are held in place by spring pressure within a twist lock shield can. To replace one of these tubes, the shield can must be removed, the tube pulled out of its socket, a replacement tube plugged into the socket and the shield can replaced. The 6E5 tubes V-103 and V-203 are held in position by the end of the tubes being held in rubber grommets in the amplifier chassis. The brackets holding the sockets of these tubes have elongated holes where they fasten to the amplifier chassis. These elongated holes permit adjustment of the brackets so that the end of the glass envelope is as far forward as possible but does not strike the escutcheon shade mounted on the front panel. To replace one of these tubes follow these steps.

a. Remove the escutcheon shade from the front of the front panel by removing its two mounting screws.

b. Slide the rubber grommet (46) back over the glass envelope of the tube. See fig. 34.

c. Remove the tube from its socket. A screw driver is necessary to pry the base of the tube from the tube socket.

d. Remove the rubber grommet (46) from the tube.

e. Place the rubber grommet (46) on the replacement tube. Be sure the thick part of the rubber grommet is toward the base of the tube.

f. Plug the replacement tube into the tube socket.

g. Slide the rubber grommet (46) into position in the hole in the front panel.

h. Loosen the two screws holding the socket mounting bracket (49) to the amplifier chassis.

i. Slide the socket mounting bracket (49) back a little way.

j. Replace the escutcheon shade with its mounting screws.

k. Push the socket mounting bracket (49) toward the front panel so that the top of the tube is as far front as possible but does not strike the escutcheon shade.

l. Tighten the screws holding the socket mounting bracket (49) to the amplifier chassis.

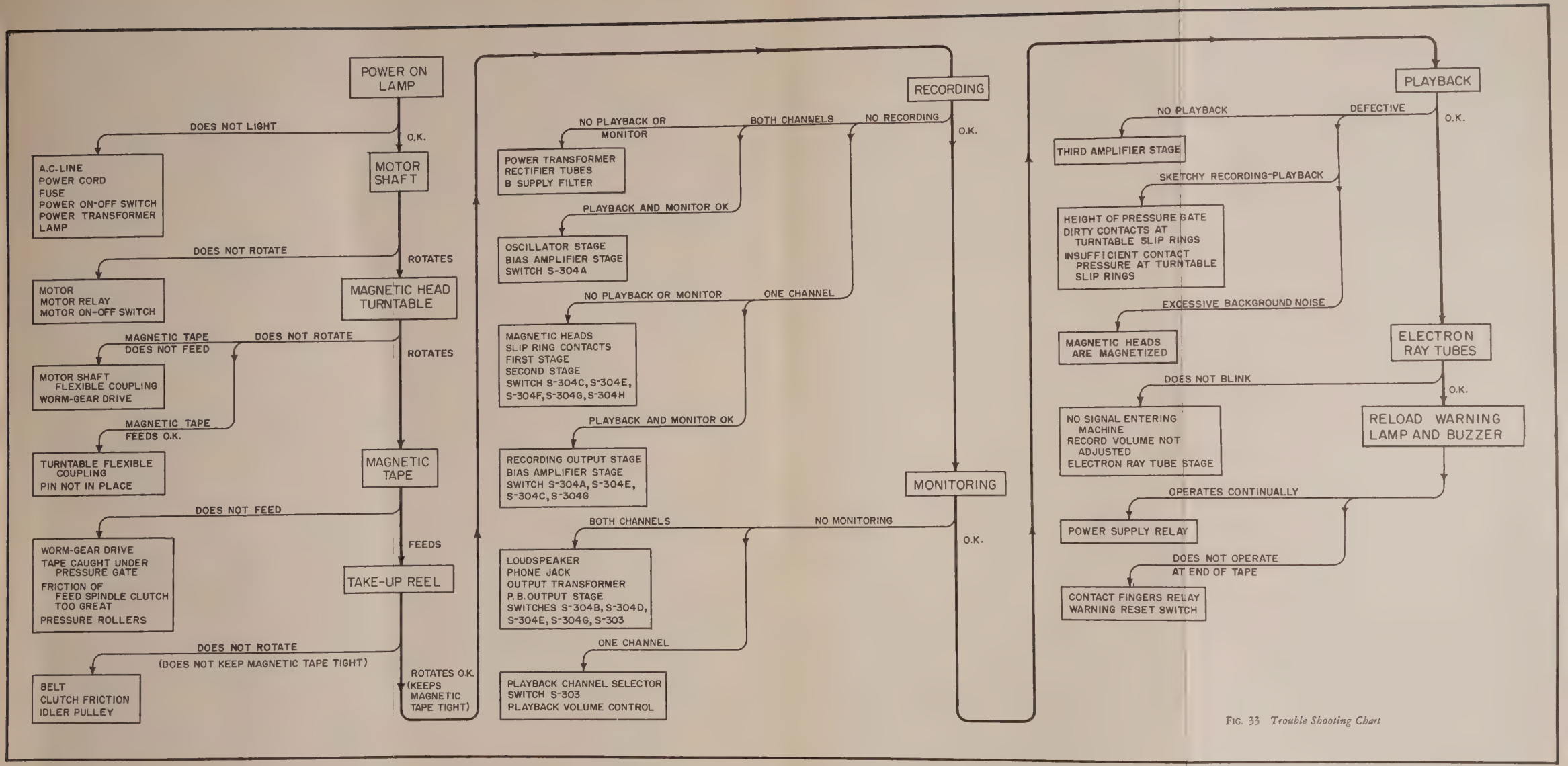
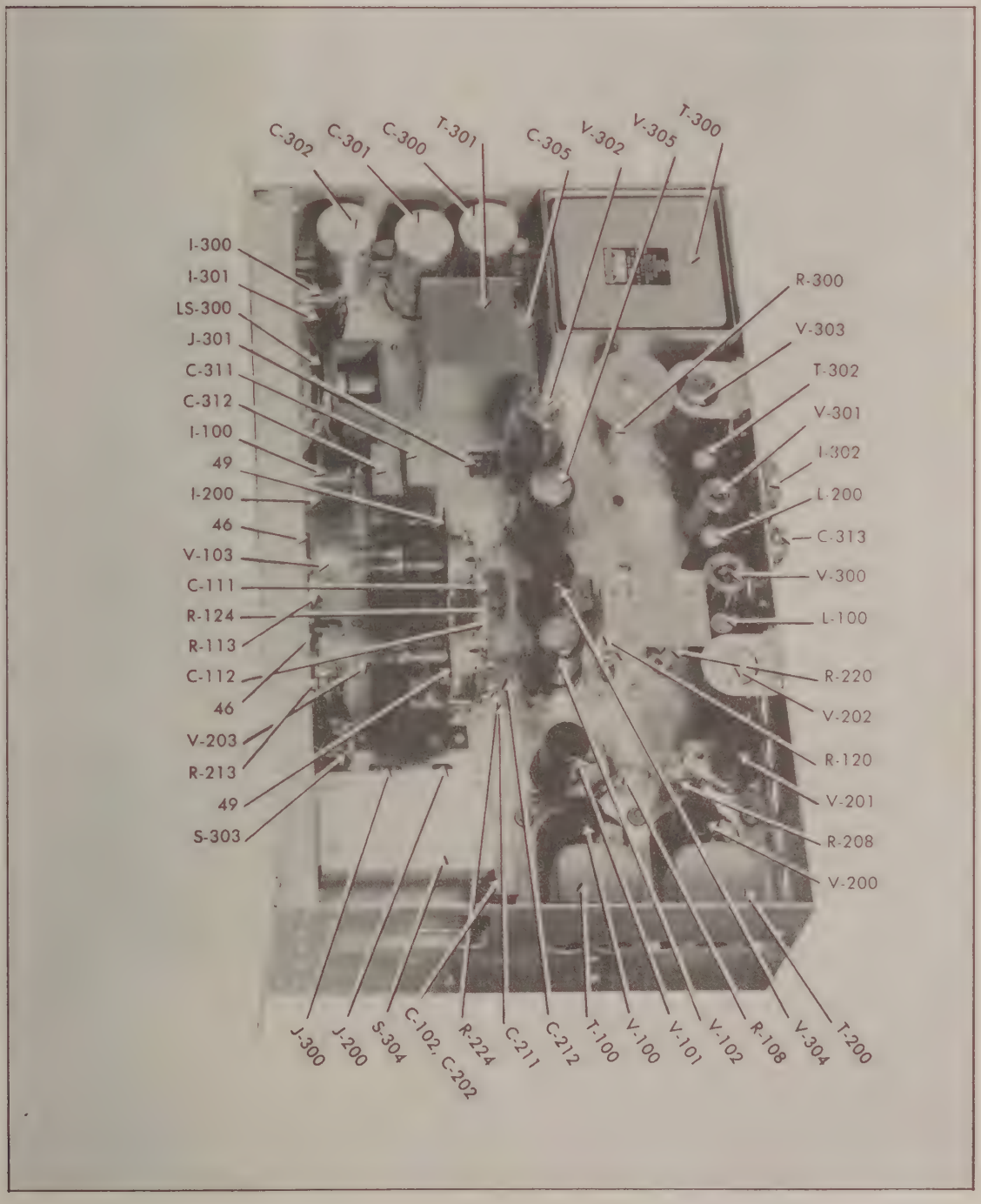


FIG. 33 *Trouble Shooting Chart*



The index numbers refer to Master Drawing S6502—3163385—*Amplifier Assembly.*

FIG. 34 *Amplifier Chassis—Top View.*

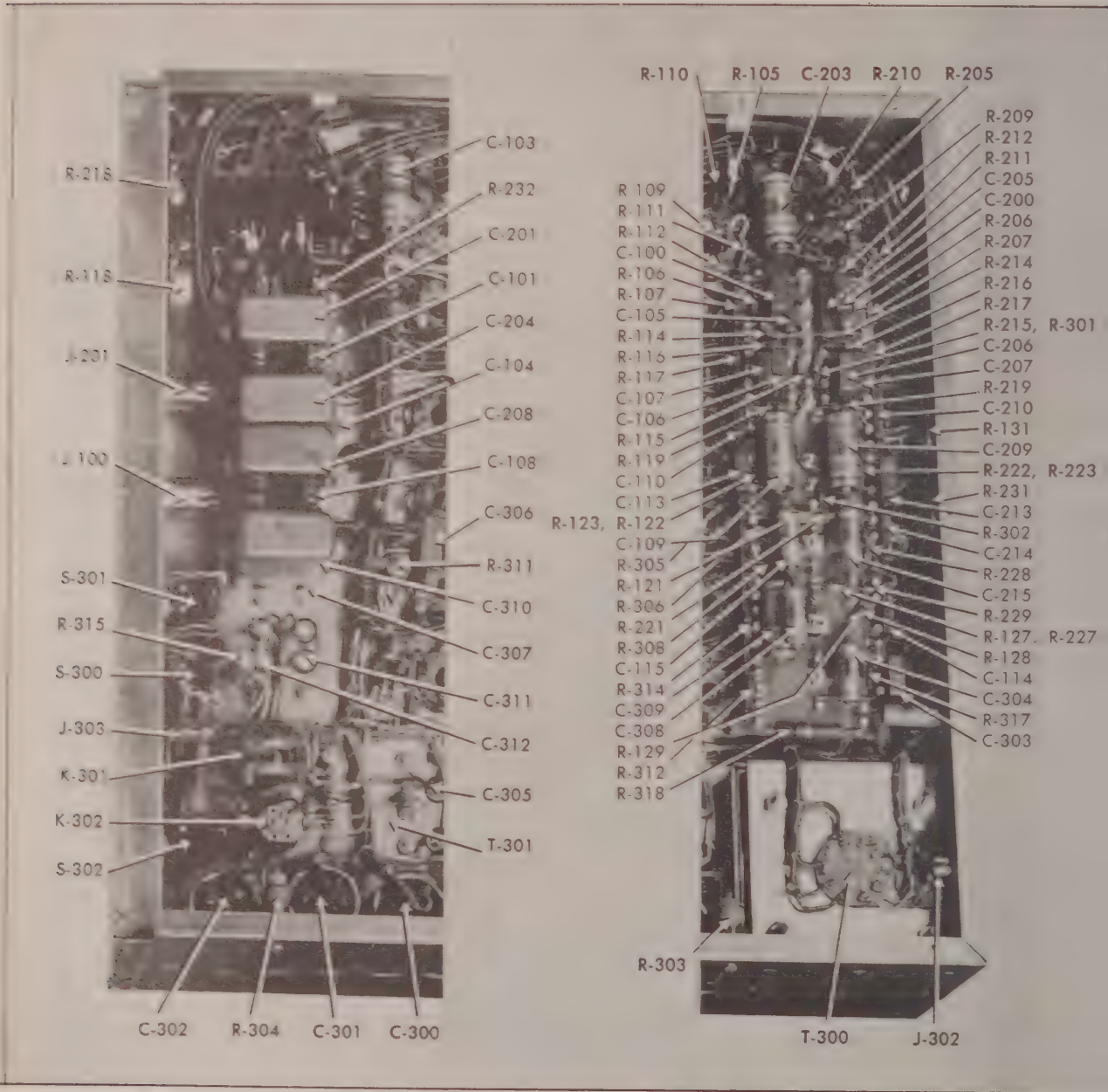


FIG. 35 *Amplifier Chassis—Bottom View.*

7. VOLTAGE AND RESISTANCE CHARTS.

a. VOLTAGE CHART.—Figure 36 is a voltage chart giving the voltage readings at the tube pins. The following notes are applicable to this chart.

(1) All readings have a tolerance of ± 10%.

(2) (N.C.) The abbreviation N.C. denotes no connection.

(3) (•) Where two readings are given, the reading designated by an asterisk (•) is the reading with the PLAYBACK-RECORD SELECTOR in the RECORD position. The second reading is with the PLAYBACK-RECORD SELECTOR in the PLAYBACK position. Where only one reading is given, the reading is the same in either position of the PLAYBACK-RECORD SELECTOR.

(4) (••) The readings designated by a double asterisk (••) are dependent on the adjustment of the bias oscillator circuit. Refer to par. 11*a* (12) of Section 5 for adjustment of the bias circuit.

(5) (†) All readings are measured between the tube socket pin and B— except the readings designated by a dagger (†). The readings designated by a dagger (†) are measured between the tube socket pin and pin 8 of one of the rectifier tubes (5Y3).

(6) All voltage readings are d-c voltages except as otherwise designated. Readings were taken with a 20,000-ohm-per-volt voltmeter with a line voltage of 115 volts and no signal input.

b. RESISTANCE CHART.—Figure 37 is a resistance chart giving the resistance readings at the tube pins. The following notes are applicable to this chart.

(1) The notes (1) (2) (3) (4) and (5) of the preceding par. 7*a* are also applicable to this chart.

(2) All readings are given in ohms except as otherwise designated. K = 1000 and Meg. = 1,000,000.

(3) All readings are given with the volume controls turned fully clockwise.

(4) (‡) The reading designated with a double dagger is given with the PLAYBACK CHANNEL SELECTOR in the 1 position.

(5) (‡‡) The reading designated by two double daggers is given with the PLAYBACK CHANNEL SELECTOR in the 2 position.

SYMBOL	TYPE	Pin Numbers								
		1	2	3	4	5	6	7	8	9
V-300	6SJ7	Shield 0	Heater 6.4 a-c	Grid 3 115° 1.1	Grid 1	Cathode 115° 1.1	Grid 2 [illegible]	Heater	Plate [illegible]	——
V-301	6SJ7	Shield 0	Heater 6.4 a-c	Grid 3 5.7° 5.5	Grid 1	Cathode 5.7° 5.5	Grid 2 [illegible]	Heater	Plate [illegible]	——
V-302	6V6	N.C.	Heater 6.4 a-c	Plate 141° 148	Grid 2 141° 148	Grid 1	N.C.	Heater 0	Cathode [illegible]	——
V-303	6E5	Heater 6.4 a-c	Plate 22° 21	Grid 0	Target [illegible] 262	Cathode	Heater	——	——	——
V-304	6SJ7	Shield 0	Heater 6.4 a-c	Grid 3 115° 1.1	Grid 1	Cathode 115° 1.1	Grid 2 [illegible]	Heater 0	Plate 95° 89	——
V-305	6SJ7	Shield 0	Heater 6.4 a-c	Grid 3 5.7° 5.5	Grid 1	Cathode 5.7° 5.5	Grid 2 [illegible]	Heater 0	Plate 100° 101	——
V-306	6V6	N.C.	Heater 6.4 a-c	Plate 141° 148	Grid 2 141° 148	Grid 1	N.C.	Heater 0	Cathode 9.0° 8.5	——
V-307	6E5	Heater 6.4 a-c	Plate 22° 21	Grid 0	Target [illegible] 262	Cathode	Heater	——	——	——
V-308	12AU7	Plate 2 [illegible] 300	Grid 2 ••	Cathode 2 27° 1°	Heater 6.4 a-c	Heater 6.4 a-c	Plate 1 [illegible] 300	Grid 1 ••	Cathode 1 [illegible] 1.1	Heater 0
V-401	6C4	Plate 240° 0	N.C.	Heater 6.4 a-c	Heater 0	Plate 240° 0	Grid ••	Cathode 0	——	——
V-402	5Y3	N.C.	Heater 4.8 a-c†	N.C.	Plate 375 a-c	N.C.	Plate 475 a-c	N.C.	Heater 0†	——
V-403	5Y3	N.C.	Heater 4.8 a-c†	N.C.	Plate 375 a-c	N.C.	Plate 475 a-c	N.C.	Heater 0†	——
V-404	6SJ7	Shield 0	Heater 6.4 a-c	Grid 3 115° 1.05	Grid 1 0	Cathode [illegible]	Grid 2 45° 40	Heater 0	Plate 95° 90	——
V-405	6V6	N.C.	Heater 6.4 a-c	Plate 255° 240	Grid 2 [illegible] 200	Grid 1 1	Tie Point Unit	Heater 0	Cathode 10° 12	——

FIG. 36 *Voltage Chart.*

SYMBOL	TYPE	PIN NUMBER								
		1	2	3	4	5	6	7	8	9
V-100	6SJ7	Shield 0	Heater 2.7	Grid 3 1500	Grid 1 57K* 19K	Cathode 1500	Grid 2 1.2 Meg.†	Heater 0	Plate 236K†	—
V-101	6SJ7	Shield 0	Heater 1	Grid 3 3900	Grid 1 180K* 165K	Cathode 3900	Grid 2 316K†	Heater 0	Plate 120K†	—
V-102	6V6	N.C.	Heater 1	Plate 13K†	Grid 2 13K†	Grid 1 500K* 0‡‡	N.C.	Heater 0	Cathode 470	—
V-103	6E5	Heater 1	Plate 1.2 Meg.†	Grid 470K	Target 2200†	Cathode 0	Heater 0	—	—	—
V-200	6SJ7	Shield 0	Heater 2.7	Grid 3 1500	Grid 1 57K* 19K	Cathode 1500	Grid 2 1.2 Meg.†	Heater 0	Plate 236K†	—
V-201	6SJ7	Shield 0	Heater .1	Grid 3 3900	Grid 1 180K* 165K	Cathode 3900	Grid 2 316K†	Heater 0	Plate 120K†	—
V-202	6V6	N.C.	Heater .1	Plate 13K†	Grid 2 13K†	Grid 1 500K* 0‡	N.C.	Heater 0	Cathode 470	—
V-203	6E5	Heater .1	Plate 1.2 Meg.†	Grid 470K	Target 2200	Cathode 0	Heater 0	—	—	—
V-300	12AU7	Plate 515†	Grid 2 ••	Cathode 2 1500	Heater .1	Heater 1	Plate 1 515†	Grid 1 ••	Cathode 1 1500	Heater 0
V-301	6C4	Plate 11K* ∞†	N.C.	Heater .1	Heater 0	Plate 11K* ∞†	Grid 470K	Cathode 0	—	—
V-302	5Y3	N.C.	Heater .05†	N.C.	Plate 75	N.C.	Plate 75	N.C.	Heater 0†	—
V-303	5Y3	N.C.	Heater .05†	N.C.	Plate 75	N.C.	Plate 75	N.C.	Heater 0†	—
V-304	6SJ7	Shield 0	Heater 1	Grid 3 550	Grid 1 1.2 Meg.	Cathode 550	Grid 2 500K†	Heater 0	Plate 115K†	—
V-305	6V6	N.C.	Heater .1	Plate 2500†	Grid 2 15K* 2500†	Grid 1 220K* 470K	Tie Point Only	Heater 0	Cathode 220	—

FIG. 37 *Resistance Chart.*

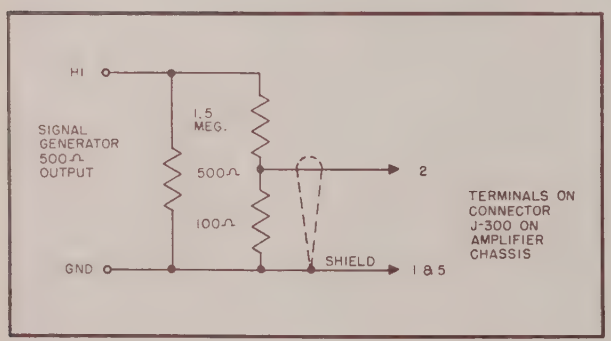


FIG. 38 *Input Connections from Signal Generator.*

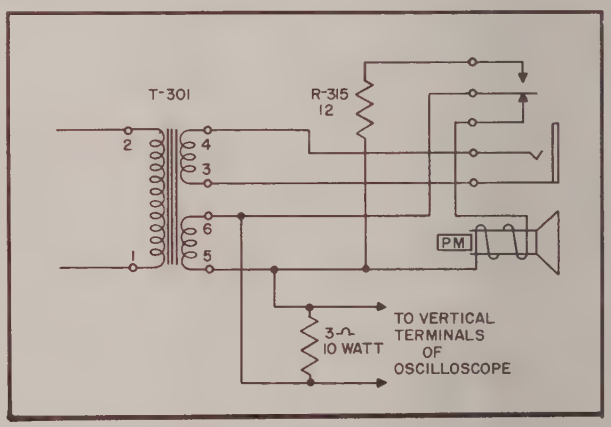


FIG. 38A *Output Connections for Playback Characteristics.*

8. AMPLIFIER CHARACTERISTICS.

a. PLAYBACK GAIN AND POWER OUTPUT.—Follow this procedure to check the playback gain and power output.

(1) Remove the amplifier chassis from its cabinet and set it on its end on a bench.

(2) Connect the 500-ohm output terminal of an audio signal generator to the terminals of the connector J-300 as shown in fig. 38.

(3) Connect an electronic voltmeter (Ballantine Model 300 or equivalent) across the output terminals of the signal generator and adjust signal generator to give a reading of 1.5 volts (63.5 db) at 600 cycles.

(4) Connect the electronic voltmeter, a 3-ohm, 10-watt resistor, and oscilloscope to terminal 5 and 6 of the output transformer T-301. See fig. 38A.

(5) Disconnect the loudspeaker by plugging an open phone plug into the PLAYBACK and MONITOR phone jack.

(6) Place the PLAYBACK-RECORD SELECTOR in the PLAYBACK position, turn PLAYBACK VOLUME AMPLIFIER NO. 1 knob fully clockwise, turn both RECORD VOLUME controls fully counterclockwise, turn the PLAYBACK VOLUME AMPLIFIER NO. 2 control fully counterclockwise, and turn the amplifier on by placing the POWER ON-OFF toggle in the ON position.

(7) After the tubes warm up the meter across the output transformer terminals should read at least 63 db. This corresponds to 106 db gain including a minus 83.5 db allowance for the attenuation of the input attenuator and a plus 23 db allowance for the input to output impedance ratio.

(8) Adjust the oscilloscope and increase the level of the audio signal generator until the wave on the oscilloscope starts to distort. At this point the electronic voltmeter connected across the output transformer should read at least 67 db (2.2 volts). This corresponds to an undistorted power output of 2 watts. Since the 12-ohm resistor R-315 is connected across the output transformer when the phone plug is placed in the phone jack, it is in parallel with the 3-ohm resistor making the actual load on the output transformer 2.4 ohms. It is on this basis that the 67 db (2.2 volts) equals 2 watts.

(9) This same procedure is applicable to the second amplifier channel except the input from the attenuator must be connected to terminals 4, and 3 and 5 of the connector J-300, the PLAYBACK VOLUME AMPLIFIER NO. 2 knob turned fully clockwise and the PLAYBACK VOLUME AMPLIFIIER NO. 1 knob turned fully counterclockwise.

b. PLAYBACK FREQUENCY RESPONSE.—Follow this procedure to check the playback frequency response.

(1) Perform the operations in the preceding pars. 8*a* (1) (2) and (4).

(2) Place the PLAYBACK-RECORD SELECTOR in the PLAYBACK position. Turn both PLAYBACK VOLUME controls and both RECORD VOLUME controls fully counterclockwise and turn amplifier on by placing POWER ON-OFF knob in the ON position.

(3) Connect an electronic voltmeter across the output terminals of the signal generator and adjust signal generator to give reading of 5 volts at 600 cycles.

(4) Adjust the PLAYBACK VOLUME AMPLIFIER NO. 1 knob to give a reading of 1 volt on the meter connected to the output transformer.

(5) Take readings of the meter connected to the output transformer at frequencies of 200, 400, 600, 1000, 2000, 3000 and 3800 cycles. Keep the voltage across the output of the signal generator constant at 5 volts. The results should correspond to curve I in fig. 40.

(6) This same procedure is applicable to the second amplifier channel except the input from the attenuator must be connected to terminals 4, and 3 and 5 of the connector J-300, the PLAYBACK VOLUME AMPLIFIER NO. 1 knob turned fully counterclockwise, and the PLAYBACK VOLUME AMPLIFIER NO. 2 knob adjusted to give a reading of 1 volt on the meter connected to the output transformer.

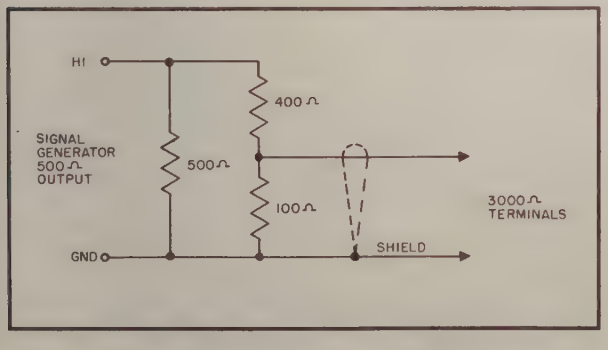


FIG. 39 *Input Connections from Signal Generator.*

c. RECORDING GAIN.—Follow this procedure to check the recording gain.

(1) Disconnect any connections made in previous tests.

(2) Disconnect the plug P-300 to disconnect the magnetic heads from the amplifier.

(3) Connect the 500-ohm output terminals of an audio signal generator to the 3000 ohm terminals of amplifier number 1 on the rear panel as shown in fig. 39.

(4) Be sure the connecting link between the GND terminal and C.T. terminal is connected.

(5) Connect an electronic voltmeter across the output terminals of the signal generator and adjust signal generator to give a reading of .1 volts at 600 cycles.

(6) Connect the electronic voltmeter, a 200-ohm, ½-watt resistor and an oscilloscope to the terminal REC. HEAD VOLTAGE AMP. 1 and the terminal GND on the rear panel.

(7) Remove the 6C4 oscillator tube V-301.

(8) Place the PLAYBACK-RECORD SELECTOR in the RECORD position, turn RECORD VOLUME AMPLIFIER NO. 1 control fully clockwise, turn both PLAYBACK VOLUME knobs fully counterclockwise, turn RECORD VOLUME AMPLIFIER NO. 2 knob fully counterclockwise, and turn amplifier on by placing the POWER ON-OFF toggle in the ON position.

(9) After the tubes warm up, the meter connected to the rear panel should read at least .026 volts (28 db).

(10) Adjust the oscilloscope and increase the level of the audio signal generator until the wave on the oscilloscope starts to distort. At this point the electronic voltmeter connected to the rear panel should read at least 40 db.

(11) This same procedure is applicable to the second amplifier channel except the input and output connections to the rear panel must be connected to the terminals designated AMP. 2, the RECORD VOLUME AMPLIFIER NO. 2 control turned fully clockwise and the RECORD VOLUME AMPLIFIER NO. 1 control turned fully counterclockwise.

d. RECORDING FREQUENCY RESPONSE.—Follow this procedure to check the recording frequency response.

(1) Perform the operations in the preceding pars. 8*c* (1) (2) (3) (4) and (6).

(2) Place the PLAYBACK-RECORD SELECTOR in the RECORD position. Turn both RECORD VOLUME controls and both PLAYBACK VOLUME controls fully counterclockwise and turn amplifier on by placing POWER ON-OFF knob in the ON position.

(3) Connect an electronic voltmeter across the output terminals of the signal generator and adjust signal generator to give a reading of .5 volts at 600 cycles.

(4) Adjust the RECORD VOLUME AMPLIFIER NO. 1 control to give a reading of .01 volts (20 db) on the meter connected to the rear panel.

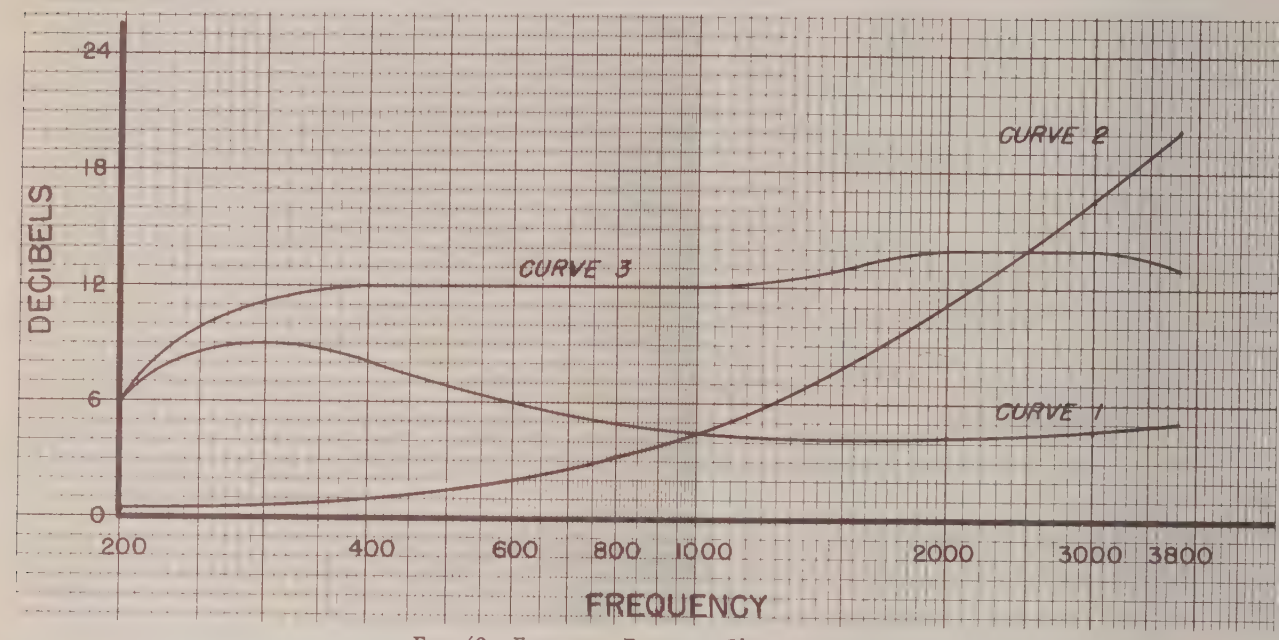


FIG. 40 *Frequency Response Characteristics.*

(5) Take readings of the meter connected to the rear panel at frequencies of 100, 200, 400, 600, 1000, 2000, 3000 and 3800 cycles. Keep the voltage across the output of the signal generator constant at .5 volts. The results should correspond to curve 2 of fig. 40.

(6) This same procedure is applicable to the second amplifier channel except the input and output connections to the rear panel must be connected to the terminals designated AMP. 2, the RECORD VOLUME AMPLIFIER NO. 1 control turned fully counterclockwise, and the RECORD VOLUME AMPLIFIER NO. 2 control adjusted to give a reading of .5 volts at 600 cycles.

e. OVERALL FREQUENCY RESPONSE.—Follow this procedure to check the overall frequency response.

(1) Perform the operations in pars. 8*c* (1) (3) (4) and (7). Be sure the connectors P-300 and J-301 are plugged into their respective connectors to interconnect the mechanical and amplifier chassis.

(2) Connect an electronic voltmeter across the output terminals of the signal generator and adjust signal generator to give a reading of .1 volts (40 db) at 1000 cycles.

(3) Place the PLAYBACK-RECORD SELECTOR in the RECORD position, turn PLAYBACK VOLUME knobs of both AMPLIFIER NO. 1 and AMPLIFIER NO. 2 fully counterclockwise, turn RECORD VOLUME AMPLIFIER NO. 2 control fully counterclockwise and turn on machine by placing POWER ON-OFF toggle in the ON position.

(4) Connect an electronic voltmeter to the terminal REC. HEAD VOLTAGE AMP. 1 and the terminal GND on the rear panel. (Be sure the 200 ohm resistor used in the recording gain and frequency response tests has been disconnected).

(5) Adjust the RECORD VOLUME AMPLIFIER NO. 1 control to give a reading of .06 volts (35.7 db) on the meter connected to the rear panel.

(6) Set meter connected to rear panel to a scale capable of reading 65 volts and plug in the 6C4 oscillator tube V-301. When the oscillator tube warms up, this meter will read the bias voltage. Adjust the bias voltage between 42 and 72 volts. Refer to par. 11*a* (2) of Section 8.

(7) Load on a reel of magnetic tape and make a recording approximately one minute long of the 1000 cycle note by placing the MOTOR ON-OFF toggle in the ON position.

(8) Continue making recordings with the signal generator adjusted to the following frequencies: 200, 400, 600, 2000, 3000 and 3800. Make each recording approximately 15 seconds long.

(9) Stop recording by placing MOTOR ON-OFF toggle in the OFF position.

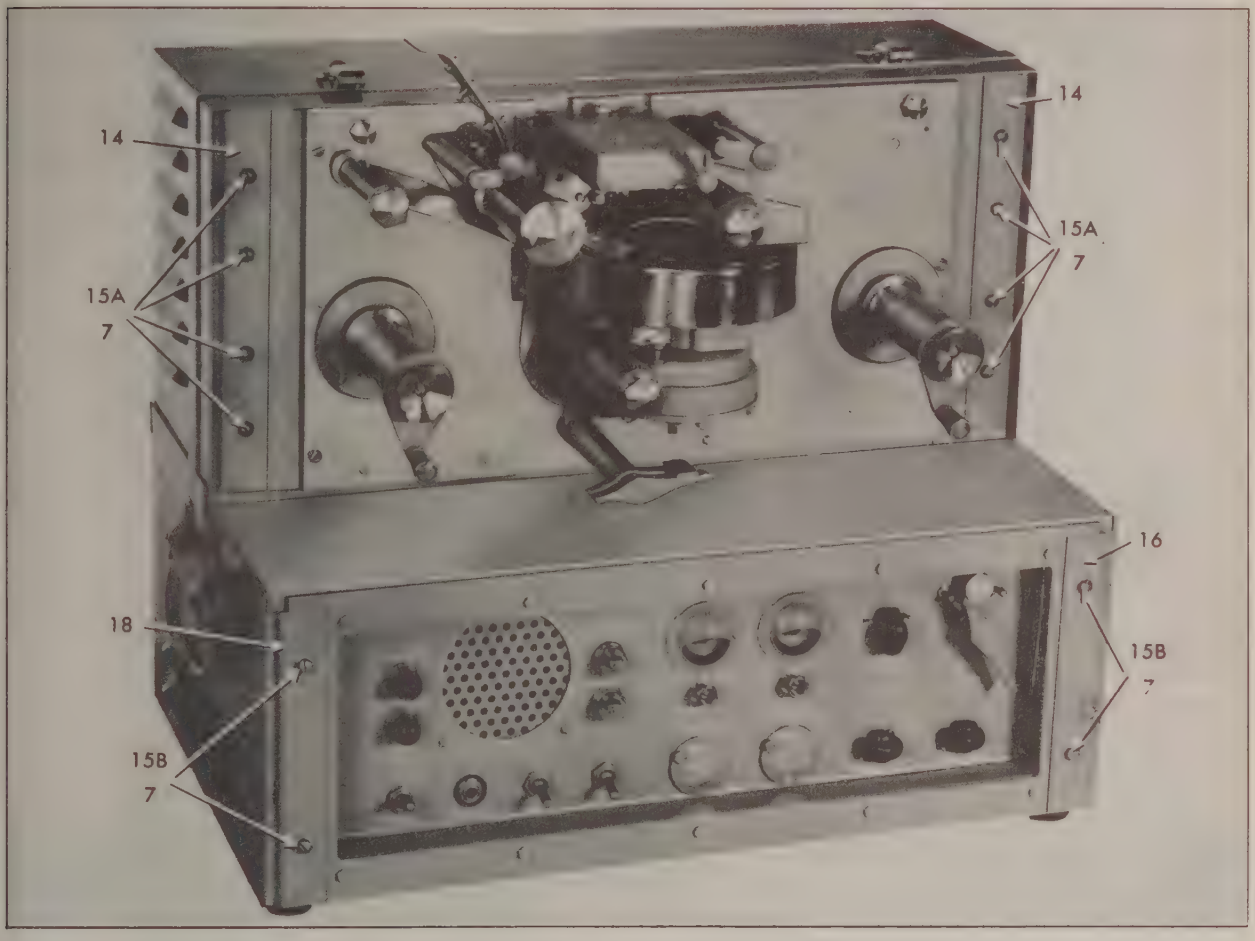
(10) Rewind the magnetic tape to the beginning of the initial 1000 cycle recording by holding the SCAN lever in a clockwise position and rotating the left-hand reel counterclockwise.

(11) Turn the RECORD VOLUME NO. 1 control fully counterclockwise.

(12) Place the PLAYBACK-RECORD SELECTOR in the PLAYBACK position and start playing back by placing the MOTOR ON-OFF toggle in the ON position and adjusting the AMPLIFIER NO. 1 PLAYBACK VOLUME control.

(13) Carefully adjust the tuning lever to give clearest and loudest playback.

(14) Connect an electronic voltmeter and an 800-ohm, 10 watt resistor to a phone plug and insert the phone plug in the PLAYBACK and MONITOR phone jack.



The index numbers refer to Master Drawing S6502H3158802—*Final Assembly.*

FIG. 41 *Recorder-Reproducer—Front View.*

(15) Adjust the PLAYBACK VOLUME AMPLIFIER NO. 1 control to give a reading of 70 db on the meter connected to the output transformer when playing back this initial 1000 cycle frequency.

(16) Read the values on the meter connected to the output transformer. Take the reading for each frequency. The results should correspond to curve 3 of fig. 40.

(17) This same procedure is applicable to the second amplifier channel except that input connections must be made to amplifier channel two and the amplifier channel two controls adjusted.

9. REMOVAL AND REPAIR.

a. RECORDER-REPRODUCER.

(1) FRONT COVER.—The front cover acts as a dust cover over the recording mechanism. It is provided with a plastic window on the front so the recording mechanism is visible. The front cover is designed so it may be used as a dust cover when the Recorder-Reproducer unit is in its cabinet or mounted in a rack. When used with the cabinet, the front cover is held in position by two hasps located on top of the cabinet and two hasps, one on each side of the cabinet. When the cover is removed the hasps must be released and the front cover lifted up and then off toward the front. There are two clips on the under side of the cover that fit onto two knobs on the face of the mechanical chassis. Therefore, when the cover is removed it must be lifted up so the clips release from the knobs and then the cover removed. These clips on the front cover and knobs on the mechanical chassis are provided so that the front cover can be used when the mechanical chassis is mounted in a rack.

(2) CABINET REAR PANEL.—The rear panel of the cabinet is held in place by eleven screws. To remove the rear panel, remove the eleven screws and their associated lockwashers.

(3) MECHANICAL CHASSIS.—Follow this procedure to remove the mechanical chassis from the cabinet or rack. See fig. 41.

(*a*) Be sure the power cord to the machine is removed from the wall outlet.

(*b*) Remove the front cover as described in par. 9*a* (1) of Section 8.

(*c*) Remove the reels from their respective spindles.

(*d*) Remove the rear panel as described in the previous par. 9*a* (2).

(*e*) Reach in through the back and disconnect the plugs P-200, P-300 and P-301. See fig. 42.

(*f*) Remove the eight screws (15A), their associated lockwashers (7), and the two trim strips (14). This releases the mechanical chassis so it may be removed. Be careful not to drop the mechanical chassis. The chassis may be set in any desired position but care should be taken so that the magnetic heads on the turntable are not damaged, the spindles on the front are not sprung out of line, and the exposed gears at the rear are not damaged.

(*g*) Replace the mechanical chassis by following the reverse procedure.

(4) AMPLIFIER CHASSIS.—Follow this procedure to remove the amplifier chassis from the cabinet. See fig. 41.

(*a*) Disconnect the power cord and all other connecting cords to the rear panel.

(*b*) Remove the rear panel as described in par. 9*a*(2) of Section 8.

(*c*) Reach in through the back and disconnect the plugs P-200, P-300 and P-301. See fig. 42. Set the cords and plugs above the amplifier chassis so that they do not interfere with removal of the chassis.

(*d*) Tip up the machine from the rear and remove the three screws and lockwashers located along the bottom rear of the cabinet.

(*e*) Remove the four screws (15B), their associated lockwashers (7), the trim strip (16) and the trim strip (18). This releases the amplifier chassis.

(*f*) Remove the amplifier chassis by raising it up and pulling it out from the front.

(*g*) Follow the reverse procedure to replace the amplifier chassis.

(5) MOTOR.

(*a*) *Removal.*—Follow this procedure to remove the motor B-300. See fig. 43.

1. Remove the mechanical chassis as described in par. 9*a* (3) of Section 8.

2. Pull out the plug P-304 to disconnect the motor.

3. Remove the two nuts (45) and their associated lockwashers (84).

4. Pull the motor out. The flexible coupling (51) and worm gear shaft (49) will come out with it.

CAUTION

Do not allow the worm gear shaft (49) to become nicked or damaged. Do not allow dust or metal chips to accumulate in the grease on worm gear shaft (49).

5. Loosen the Allen-head set screw (52) that holds the sleeve (53) to the motor shaft and pull the sleeve (53) off the motor shaft.

6. Remove the plug P-304 from the motor leads. Note the terminal numbers of the plug and the color code of the wires to facilitate replacement.

(*b*) *Installation.*—Follow this procedure to install a replacement motor B-300. See fig. 43.

1. Place the sleeve (53) on the replacement motor shaft. Be sure sleeve is positioned on the motor shaft so that the Allen-head set screw (52) will seat in the hole in the motor shaft.

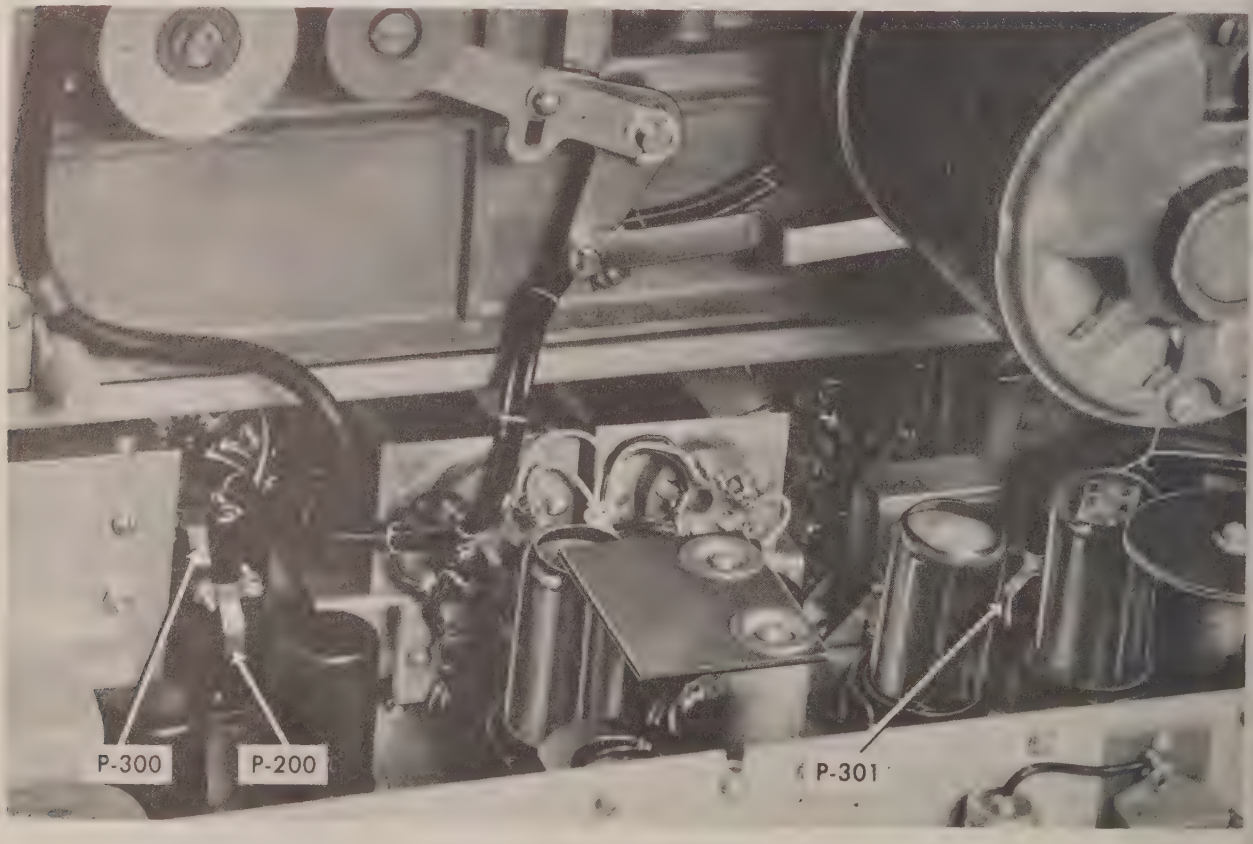
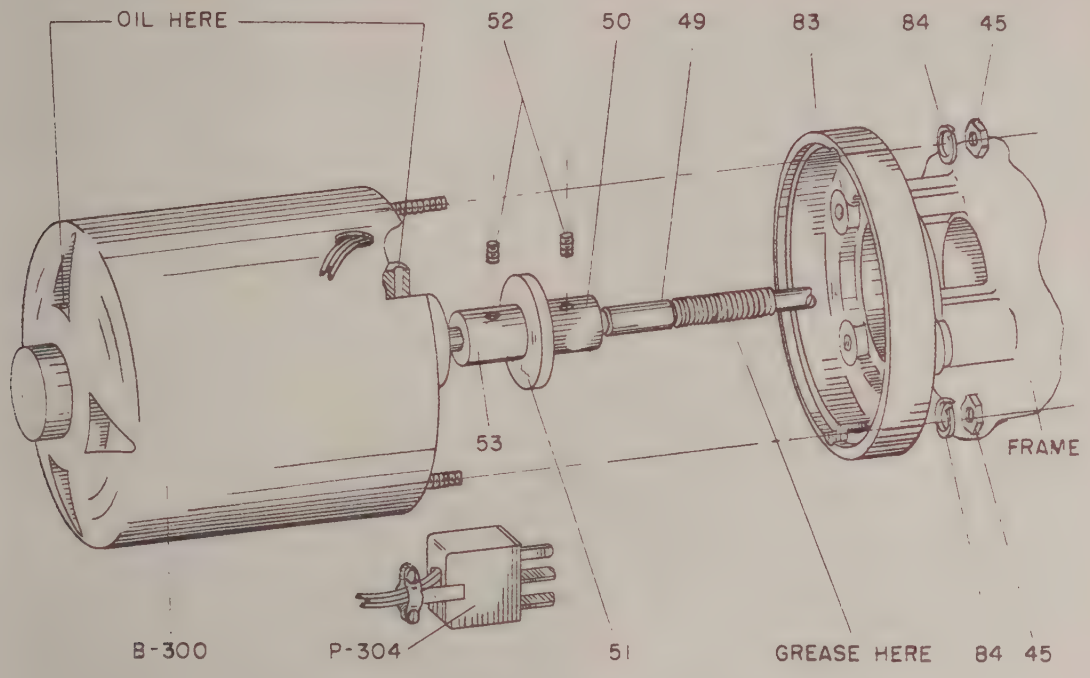


FIG. 42 *Disconnection Between Amplifier and Mechanical Chassis.*



The index numbers refer to Master Drawing S6502H3158804*—Mechanical Assembly.*
FIG. 43 *Motor Replacement.*

2. Connect the plug P-304 to the replacement motor leads.

3. Be sure the sleeves (53) and (50) are screwed finger tight to the coupling (51). The sleeves are held to the coupling by left-hand threads. Hold the sleeve (53) with your left hand and turn the sleeve (50) counterclockwise with your right hand.

4. Lift the motor and shaft assembly and insert the worm gear shaft (49) into the bearing hole of the mechanical chassis from which it was removed. Insert the shaft slowly. It may be necessary to move the magnetic head turntable back and forth a slight amount so that the worm gear shaft (49) will mesh with its associated gear. Move the turntable back and forth as you push the worm gear shaft into place. Push all the way in until the motor mounting screws go through the adapter ring (83). Be sure the motor is right side up. The oil holes should face the top of the machine.

5. Fasten the motor by replacing the two nuts (45) and their associated lockwashers (84).

6. Insert the motor plug P-304 into the socket J-304.

7. Replace the mechanical chassis in the cabinet or rack. Refer to par. 9*a* (3) of Section 8.

8. If necessary, adjust the end thrust screw. Refer to par. 10*d* of Section 8.

(6) FLEXIBLE COUPLING ON MOTOR SHAFT.—Follow this procedure to replace the flexible coupling (51) between the motor shaft and worm gear shaft (49). See fig. 43.

(*a*) Remove the motor B-300 as described in pars. 9*a* (5) (*a*) 1, 2, 3 and 4 of Section 8.

(*b*) Disconnect the sleeve (50) from the flexible coupling (51) by holding the coupling with one hand as you turn the sleeve (50) with your other hand in a clockwise direction as you face the end of the shaft (left-hand thread).

(*c*) Disconnect the flexible coupling (51) from the sleeve (53) in a similar manner. Hold the sleeve as you turn the coupling.

CAUTION

If tools are required to loosen the flexible coupling, place the gripping tool on sleeves (50) and (53). Do not mar the worm gear shaft (49) by applying a tool to it.

(*d*) Screw a replacement flexible coupling (51) to the sleeve (50) and sleeve (53).

(*e*) Replace the motor as described in pars. 9*a* (5) (*b*) 3 through 8 of Section 8.

(7) MAGNETIC HEAD TURNTABLE.—Follow this procedure to remove the turntable of magnetic heads (33). See fig. 44.

(*a*) Remove the reels from their respective spindles.

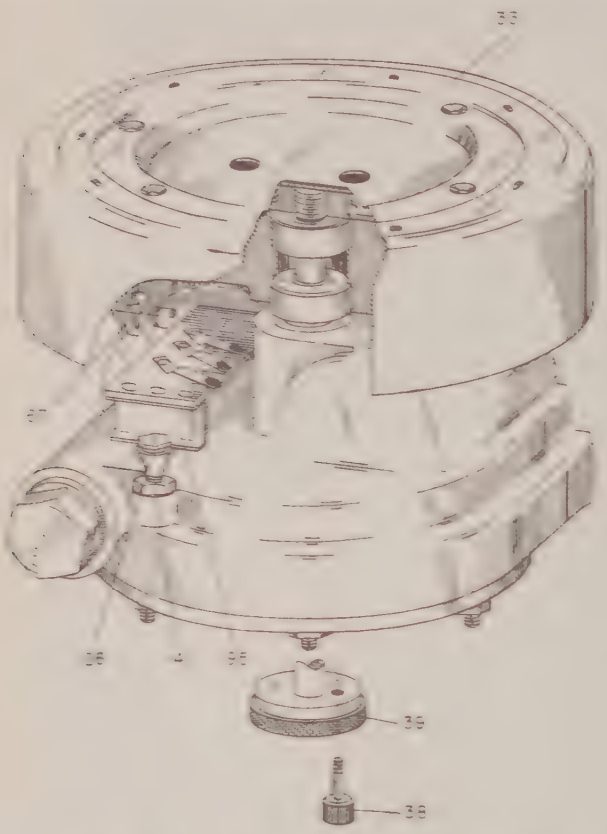
(*b*) Shut off the machine by placing the POWER ON-OFF switch in the OFF position.

(*c*) Turn the LOAD-SCAN control to its fully clockwise position.

(*d*) Pull down the brush holder (95) away from the slip rings under the turntable by pushing the bracket on the brush holder (95) out of the slot on the latch (126) and then down.

(*e*) Unscrew the thumb screw (38).

(*f*) Hold the thumb nut (39) as you rotate the turntable of magnetic heads (33) slowly in a clockwise direction as you look at the top of the turntable. (This is a left-hand thread). Rotate the turntable until you can pull



The index numbers refer to Master Drawing S6502H3158804—*Mechanical Assembly.*
FIG. 44 *Magnetic Head Turntable.*

down the thumb nut (39) and its associated shaft. If the flexible coupling within the turntable (33) has been torn for any reason, it is not possible to perform this step. Refer to the note in par. 9*a* (11) of Section 8.

(*g*) Pull the turntable of magnetic heads (33) straight out.

CAUTION

During the process of removing or installing a turntable of magnetic heads, do not allow the top of the heads to become damaged or bend the brush contacts.

(*b*) Install a replacement turntable of magnetic heads (33) by following the reverse procedure. When the thumb screw (38) is replaced, it is necessary to rotate the turntable to line up the screw with its mounting hole. Check the continuity between the slip rings and their associated brush contacts. Refer to par. 11*a* (1) of Section 8.

(8) DEMAGNETIZATION OF MAGNETIC HEADS.—Follow this procedure to demagnetize the magnetic heads.

(*a*) Remove the magnetic head turntable (33) as described in the previous par. (7).

(*b*) Remove the top cover of the Demagnetizer.

(*c*) Set something non-metallic, such as a couple of books, on top of the pole pieces of the Demagnetizer. Their height should be two to three inches.

(*d*) Place the turntable of magnetic heads on top of the books over the pole pieces. Set the turntable with the slip rings down.

(*e*) Hold the POWER ON-OFF switch S-400 on as you rotate the turntable several revolutions.

(*f*) Pull away the turntable of magnetic heads.

(*g*) Release the POWER ON-OFF switch.

(*h*) Replace the turntable of magnetic heads on the machine.

(9) BRUSH CONTACTS.—Follow this procedure to replace the brush contacts (95). See fig. 44.

(*a*) Remove the turntable of magnetic heads (33) as described in par. 9*a* (7) of Section 8.

(*b*) Remove the retainer ring (67) from its mounting post.

(*c*) Slide the contact assembly (95) off its mounting post.

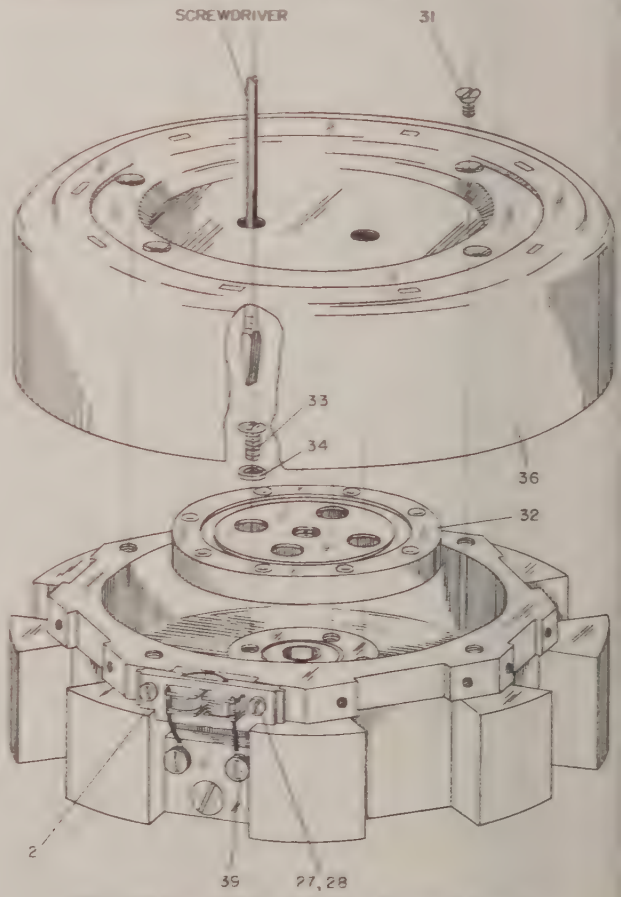
(*d*) Disconnect the leads from the contact assembly.

(*e*) To install a replacement contact assembly follow the reverse procedure. When the leads are soldered to the contact assembly be sure the two shields are connected to the common center contact.

(*f*) Test and adjust contacts as described in par. 11*a* (1) of Section 8.

(10) MAGNETIC HEADS.—Follow this procedure to install replacement magnetic heads (2). See fig. 45.

(*a*) Remove the turntable of magnetic heads as described in par. 9*a* (7) of Section 8.



The index numbers refer to Master Drawing S6502H3158803—*Turntable Assembly.*
FIG. 45 *Magnetic Heads Replacement.*

NOTE

Always use a demagnetized or a non-magnetic screwdriver when working on the magnetic head turntable. A magnetized screwdriver can be demagnetized in the Demagnetizer. A non-magnetic screwdriver is supplied in the Maintenance Kit.

(*b*) Remove the top cover (36) of the turntable by removing the four screws (31) and lifting off the cover (36).

(*c*) Disconnect the leads from each individual head assembly (2) by loosening the two associated screws (39) and pulling out the spade lugs from behind the screws.

(*d*) Remove each individual head assembly (2) by removing the two associated screws (27) and lockwashers (28).

(*e*) Install replacement magnetic heads (2) by following the reverse procedure. Be sure the leads of the heads face toward the outside of the turntable and the leads connected to their corresponding terminal directly below. Do not cross the leads.

(11) FLEXIBLE COUPLING IN MAGNETIC HEAD TURNTABLE.—Follow this procedure to replace the flexible coupling (32) within the turntable of magnetic heads. See fig. 45.

(*a*) Remove the magnetic head turntable as described in par. 9*a* (7) of Section 8.

NOTE

If this flexible coupling (32) is ripped, it is not possible to remove the turntable as described in par. 9*a* (7) (*f*) of Section 8. To remove the magnetic head turntable, it is necessary to place a screwdriver down through one of the holes provided in the top cover (36) of the turntable so that the screwdriver engages one of the holes in the coupling (32). Hold the screwdriver in this position and rotate the thumb nut (39) counterclockwise until the thumb nut and spindle pull down. See fig. 44. Then it is possible to remove the magnetic head turntable.

(*b*) Remove the top cover of the turntable (36) by removing the four screws (31) and lifting off the cover.

(*c*) If the flexible coupling (32) is torn in two pieces, the center piece will be loose and can be lifted out. Remove the four screws (33) and their associated lockwashers (34) to remove the outer portion of the flexible coupling. If the coupling is not torn in two pieces, there are four holes in the center piece through which the four screws (33) can be reached with a screwdriver.

(*d*) Follow the reverse procedure to install a replacement flexible coupling (32).

(12) SLIP RINGS.—Follow this procedure to replace the slip rings under the turntable of magnetic heads.

(*a*) Rmove the turntable of magnetic heads and flexible coupling as described in the previous par. (11).

(*b*) Remove the four nuts and their associated lockwashers and flat washers that hold each slip ring in place. These nuts are located on the top surface of the turntable under the flexible coupling. Be sure to note which nuts have the solder lugs fastened under them so that the solder lugs may be replaced in the proper place.

(*c*) Remove the slip rings. If the screw studs are in the slip rings, remove them.

(*d*) Install replacement slip rings by following the reverse procedure. If any of the insulators fall out of place, be sure to replace them.

(13) TURNTABLE GEAR CLUSTER.—Follow this procedure to replace the gear cluster (36) to the turntable of magnetic heads. See fig. 46.

(*a*) Remove the turntable of magnetic heads as described in par. 9*a* (7) of Section 8.

(*b*) Remove the six nuts (41) and their associated lockwashers (10).

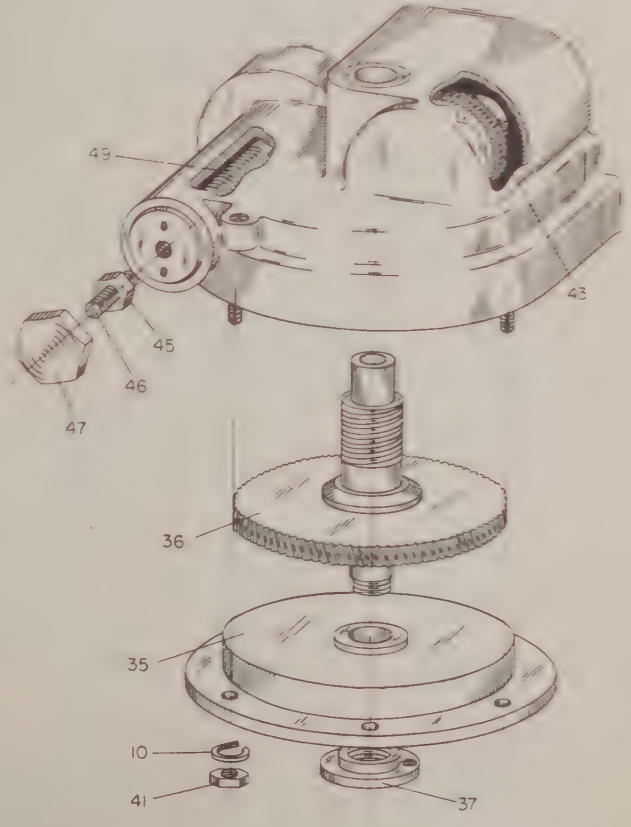
(*c*) It is now possible to remove the gear cluster. Pull down on the gear box cover (35).

(*d*) To remove the gear cluster (36) from the gear box cover (35), hold gear cluster (36) as you unscrew the nut (37).

(*e*) Install a replacement gear cluster (36) by following the reverse procedure. Lubricate the complete surface of the gear cluster (36) with a film petrolatum.

CAUTION

When a gear cluster (36) is installed, the gear cluster and lubricant must be free of dirt and any metal chips or filings.



The index numbers refer to Master Drawing S6502H3158804—Mechanical Assembly.

FIG. 46 *Turntable Gear Cluster Replacement.*

(14) PRESSURE GATE.—Follow this procedure to replace the pressure gate (82). See fig. 47.

(*a*) Place the LOAD lever (111) and SCAN lever (110) in their fully clockwise position. See fig. 28.

(*b*) Remove the reels from their spindles.

(*c*) Remove one end of the spring (120).

(*d*) Pull the pressure gate (82) off by pulling straight up until the gate leaves the ways (78) and (79).

(*e*) Follow the reverse procedure to install a pressure gate (82). Be sure the slot in the lever (94) is placed into the slot in the post (119).

(*f*) Check adjustment of the height of the pressure gate (82). Refer to par. 10*i* of Section 8.

(15) PRESSURE PLATE.—Follow this procedure to replace a pressure plate (118). See fig. 47.

(*a*) Place the LOAD lever (111) and the SCAN lever (110) in their fully clockwise position. See fig. 28.

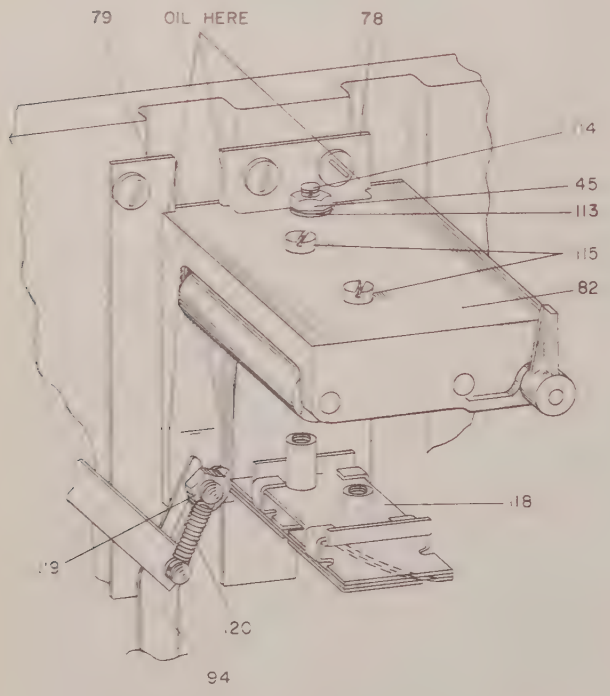
(*b*) If magnetic tape is threaded through machine, wind it up on one reel or remove the reels.

(*c*) Hold one hand under the pressure gate (82) as you remove the two screws (115) on top of the gate. The pressure plate (118) will fall out when these screws are removed.

(*d*) Install a replacement pressure plate by following the reverse procedure.

CAUTION

Be sure the arc on the under side of the pressure plate (118) is in the right direction. The magnetic heads must track through this arc for proper operation. Installing this in the wrong direction may cause damage to the magnetic heads.



The index numbers refer to Master Drawing S6502H3158804—*Mechanical Assembly.*
FIG. 47 *Pressure Gate Replacement.*

(*e*) Check adjustment of the height of pressure gate (82). Refer to par. 10*i* of Section 8.

(16) GUIDE ROLLER NO. 1.—Follow this procedure to replace the roller (100) or end flanges (99) of the number one guide roller. See fig. 48.

(*a*) Remove the magnetic tape from over the guide roller.

(*b*) Remove the nut (98).

(*c*) The two end flanges (99) and roller (100) will now pull off their shaft.

(*d*) To replace the end flanges (99) or roller (100) follow the reverse procedure.

(17) GUIDE ROLLER NO. 2.—Follow this procedure to replace the roller (88) or end flanges (87). See fig. 48.

(*a*) Remove the magnetic tape from over the guide roller.

(*b*) Remove the nut (89).

(*c*) The two end flanges (87) and roller (88) will now pull off their shaft.

(*d*) To replace the end flanges (87) or roller (88) follow the reverse procedure.

(18) TAPERED GUIDE ROLLER.—To replace the tapered guide roller assembly (102). follow this procedure. See fig. 48.

(*a*) Remove the thumb nut (7). This nut is for dressing purposes only and does not need to be more than finger tight.

(*b*) Remove the retainer ring (67).

(*c*) Remove the retainer ring (13). The complete assembly (102) is now free. Pull the assembly off its shaft. Be careful not to lose the thrust washer (103) and the two thrust washers (3).

(*d*) To remove the shoe assembly (93) from the guide roller assembly (102), remove the screw (92).

(*e*) To remove the magnetic tape shoe (93-1) from its arm (93-2), remove the shoulder screw (93-3) and its associated nut (93-4), and remove the shoulder screw (93-5) and its associated nut (93-6) and spring (93-7).

(*f*) To assemble replacement components, follow the reverse procedure. Be sure to attach the link (96) and properly place the thrust washers (3) and (103). The shaft that holds this assembly should have a light film of petrolatum.

(19) DRIVE ROLLER.—To replace the components of the drive roller assembly (60) follow this procedure. See fig. 48.

(*a*) Place the LOAD lever (111) and SCAN lever (110) in their fully clockwise position. See fig. 28.

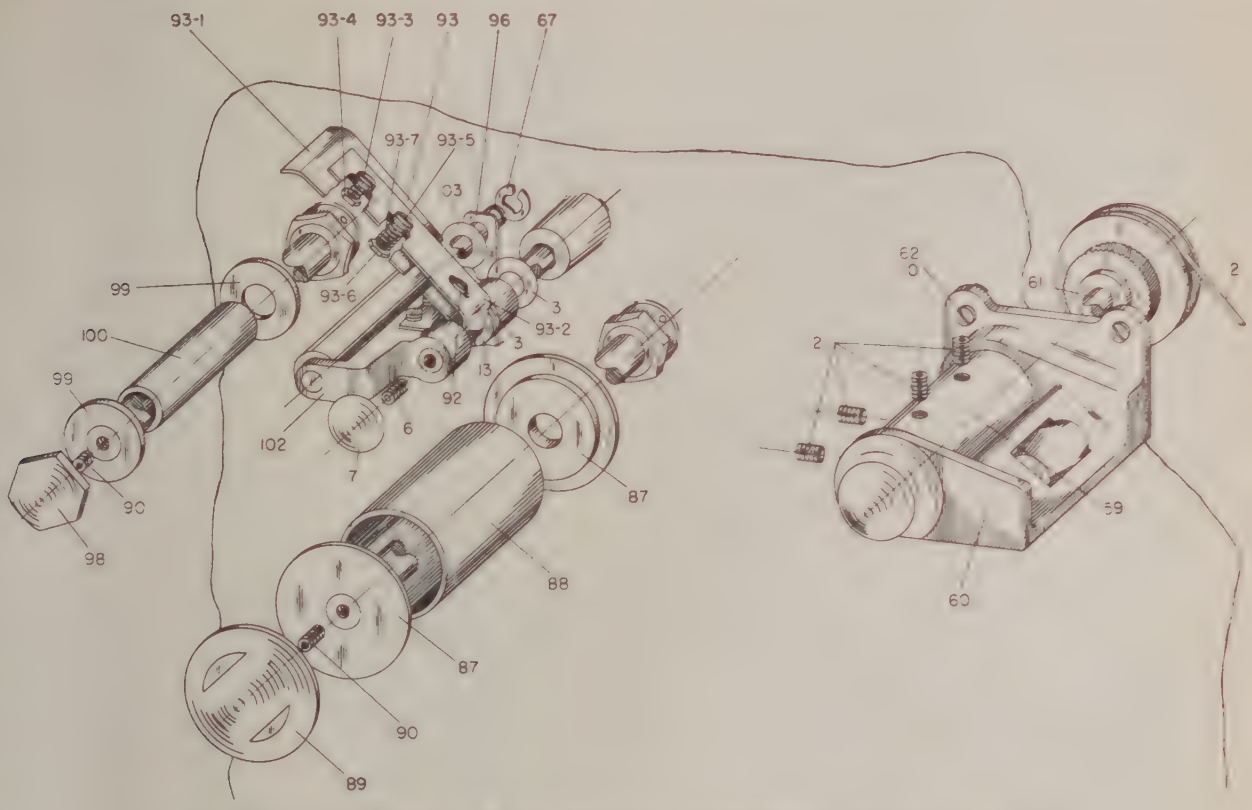
(*b*) Remove the belt (2).

(*c*) Remove the turntable of magnetic heads. Refer to par. 9*a* (7) of Section 8.

(*d*) Remove the four Allen-head set screws (21) in the roller (59) with a number eight Allen wrench. Start and stop the motor so that the roller (59) will rotate to a position where the Allen-head screws (21) are easily accessible with a wrench.

(*e*) Hold one hand under the drive roller (59) and pull out the shaft and gear assembly (61) from the rear by grasping the pulley with your other hand. When the shaft and gear assembly (61) is pulled out, the roller (59) will drop in your hand.

(*f*) Remove the three screws (62) and their associated lockwashers (10). The drive roller assembly (60) will now come off the chassis.



The index numbers refer to Master Drawing S6502H3158804—*Mechanical Assembly.*

FIG. 48 *Roller Replacement.*

(*g*) Follow the reverse procedure to install a replacement drive roller assembly (60). Before the screws (21) are tightened, be sure the gear on the shaft (61) lines up with its mating gear.

CAUTION

When a drive roller assembly (60) is disassembled always use the roller (59) supplied with the assembly. These assemblies are supplied complete. The roller (59) is selected at time of assembly to provide the greatest accuracy of magnetic tape feed. Do not mar the surface of the roller (59). It is ground to very accurate dimensions.

(20) PRESSURE ROLLERS.—Follow this procedure to replace the assembly of pressure rollers (5). See fig. 49.

(*a*) Rotate LOAD lever (111) and SCAN lever (110) to their fully clockwise position. See fig. 28.

(*b*) Loosen the two Allen-head set screws (52) a few turns so they rise out of the holes in the shaft. These are number eight Allen-head screws.

(*c*) Pull the pressure roller assembly (5) out from the front. Do not lose the two thrust washers (3), one on each side of the mechanical chassis.

(*d*) To remove the contact assembly (8), remove the screw (9) and its associated lockwasher (10) and flat washer (11). The contact assembly (8) then pulls off.

(*e*) Follow the reverse procedure to install a replacement pressure roller assembly (5). Be sure the two thrust washers (3) are in place. Be sure the set screws (52) go into the holes provided in the shaft. The shaft should have a thin film of petrolatum.

(21) FEED SPINDLE.—Follow this procedure to replace the components of the feed spindle. See fig. 49.

(*a*) Remove the two Allen-head screws (21) or loosen them several turns so that they come out of the slot in the shaft. These are number eight Allen-head set screws.

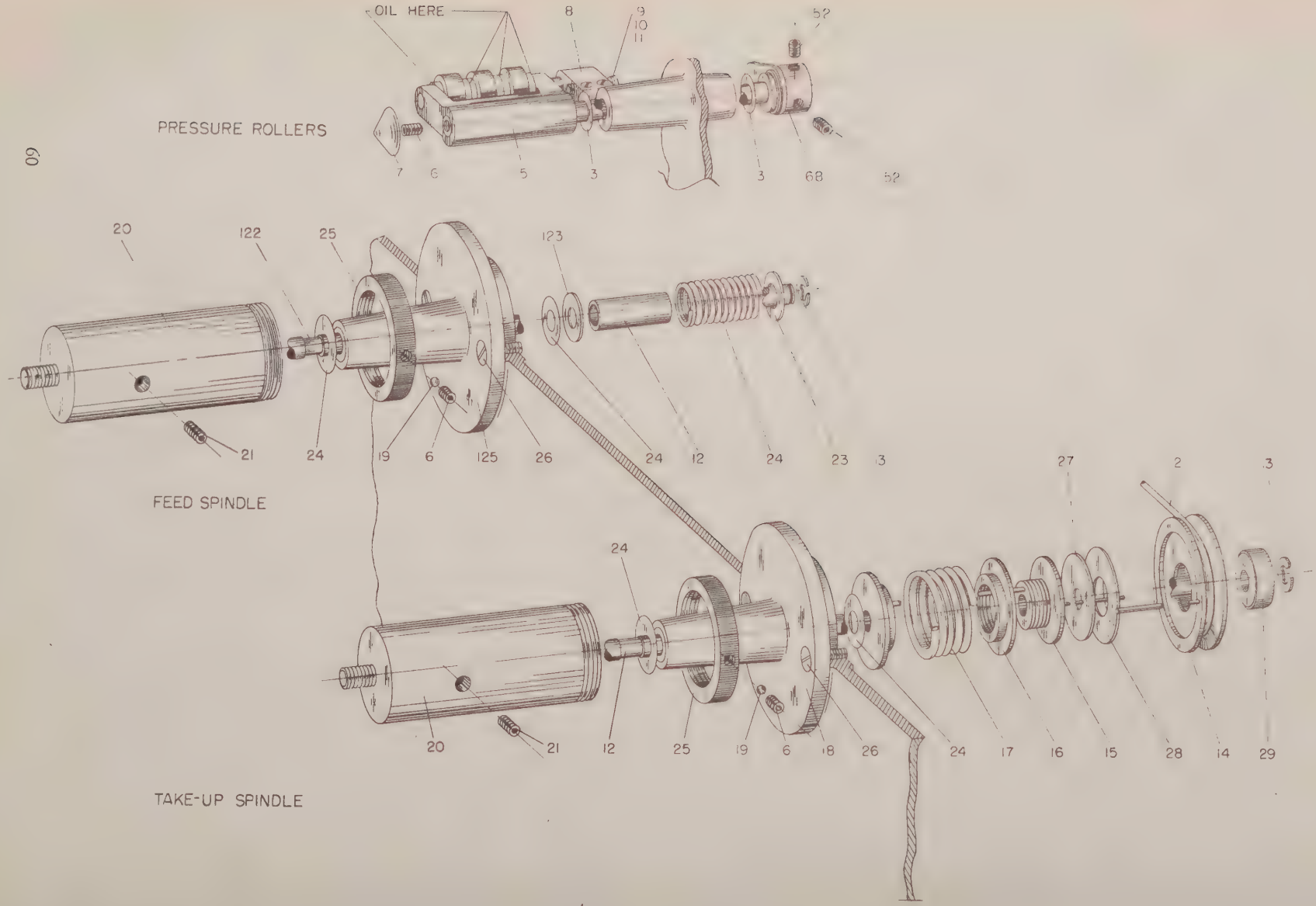
(*b*) Hold the back end of the shaft (122) with a pair of pliers and unscrew the spindle (20) until it pulls off.

(*c*) Pull the shaft (122) out from the rear.

(*d*) The bearing assembly (125) is removed from the mechanical chassis by removing the four screws (26).

(*e*) Follow the reverse procedure to install the components. The shaft (122) should have a light film of petrolatum. When the spindle (20) is screwed onto the shaft (122) it should not be screwed up tight. It should be screwed on to the point where there is a minute amount of end play and then the screws (21) tightened.

(*f*) Check the clutch tension as described in par. 10*c* of Section 8.



The index numbers refer to Master Drawing S6502H3158804—*Mechanical Assembly.*

FIG. 49 *Spindle Replacement.*

(*g*) Adjust the collar (25) as described in par. 10*g* of Section 8.

(22) TAKE-UP SPINDLE.—Follow this procedure to remove the components of the take-up spindle. See fig. 49.

(*a*) Place the LOAD lever (111) and the SCAN lever (110) in their fully clockwise position. See fig. 28.

(*b*) Remove the belt (2).

(*c*) Remove the two Allen-head set screws (21) or loosen them several turns so that they come out of the slot in the shaft. These are number eight Allen-head set screws.

(*d*) Hold the back end of the shaft (12) with a pair of pliers and unscrew the spindle (20) until it pulls off.

(*f*) Pull the shaft (12) out from the rear.

(*g*) The clutch components will slide off the shaft (12) when the retainer (13) is removed.

(*h*) The bearing assembly (18) is removed from the chassis by removing the four screws (26).

(*i*) Follow the reverse procedure to install the components. The front part of the shaft (12) going through the bearings of the mechanical chassis and the two thrust washers (24) should have a light film of petrolatum. The clutch parts should not be lubricated. Be sure the clutch parts are replaced in proper sequence. The pins on the pulley (14) should insert into the slots at the outside edge of the two nylon friction discs (28). The pin on the clutch plate (15) should go into the small holes provided in the two steel friction discs (27). The pin on the flange of the shaft (12) should go into the hole provided in the clutch plate (15). When the spindle (20) is screwed onto the shaft (12) it should not be screwed up tight. It should be screwed on to the point where there is a minute amount of end play and then the screws (21) tightened.

(*j*) Adjust the clutch tension as described in par. 10*a* of Section 8.

(*k*) Adjust the collar (25) as described in par. 10*g* of Section 8.

(23) GEARING TO DRIVE ROLLER.—Follow this procedure to replace the gearing to the drive roller. See fig. 50.

(*a*) Remove the motor. Refer to par. 9*a* (5) of Section 8.

(*b*) Remove the belt.

(*c*) Remove the mounting plate (105) by removing the three screws (64) and their associated lockwashers (10) and flat washers (11).

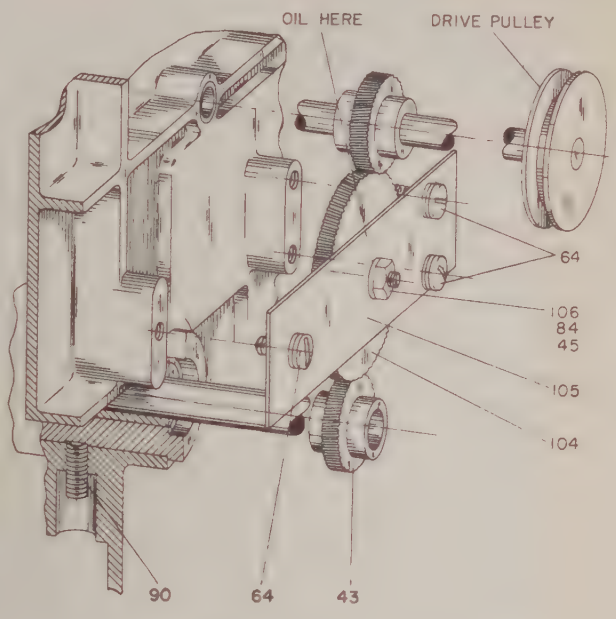
(*d*) Remove the idler gear (104) by removing the shoulder screw (106) and its associated nut (45) and lockwasher (84).

(*e*) Remove the adapter ring (83) (see fig. 43) by removing the three screws from the front of the mechanical chassis that hold it in place.

(*f*) Loosen the screw (90) a few turns. This is a number eight Allen-head set screw.

(*g*) Pull out the drive shaft assembly (43) from the rear.

(*h*) Follow the reverse procedure to assemble the components of the gearing to the drive roller. The mounting holes in the plate (105) have slightly oversize holes. Shift the mounting plate (105) so that the idler gear meshes properly with the two mating gears and then tighten the three screws (64).



The index numbers refer to Master Drawing S6502H3158804—Mechanical Assembly.
FIG. 50 *Drive Roller Gearing Replacement.*

b. DEMAGNETIZER.

WARNING

The Demagnetizer employs voltages which are dangerous and may be fatal if contacted by operating personnel. To avoid casualties always remove power and discharge capacitor. A resistor is used to automatically discharge the capacitor when the power is off but these precautions should still be taken to avoid casualties.

(1) CABINET.

(*a*) *Top Cover.*—The top cover of the Demagnetizer is held by two hasps—one on each end. See fig. 51. To remove the top cover, release the hasps and pull the top cover up. Removing the top cover gives access to the controls and storage compartment.

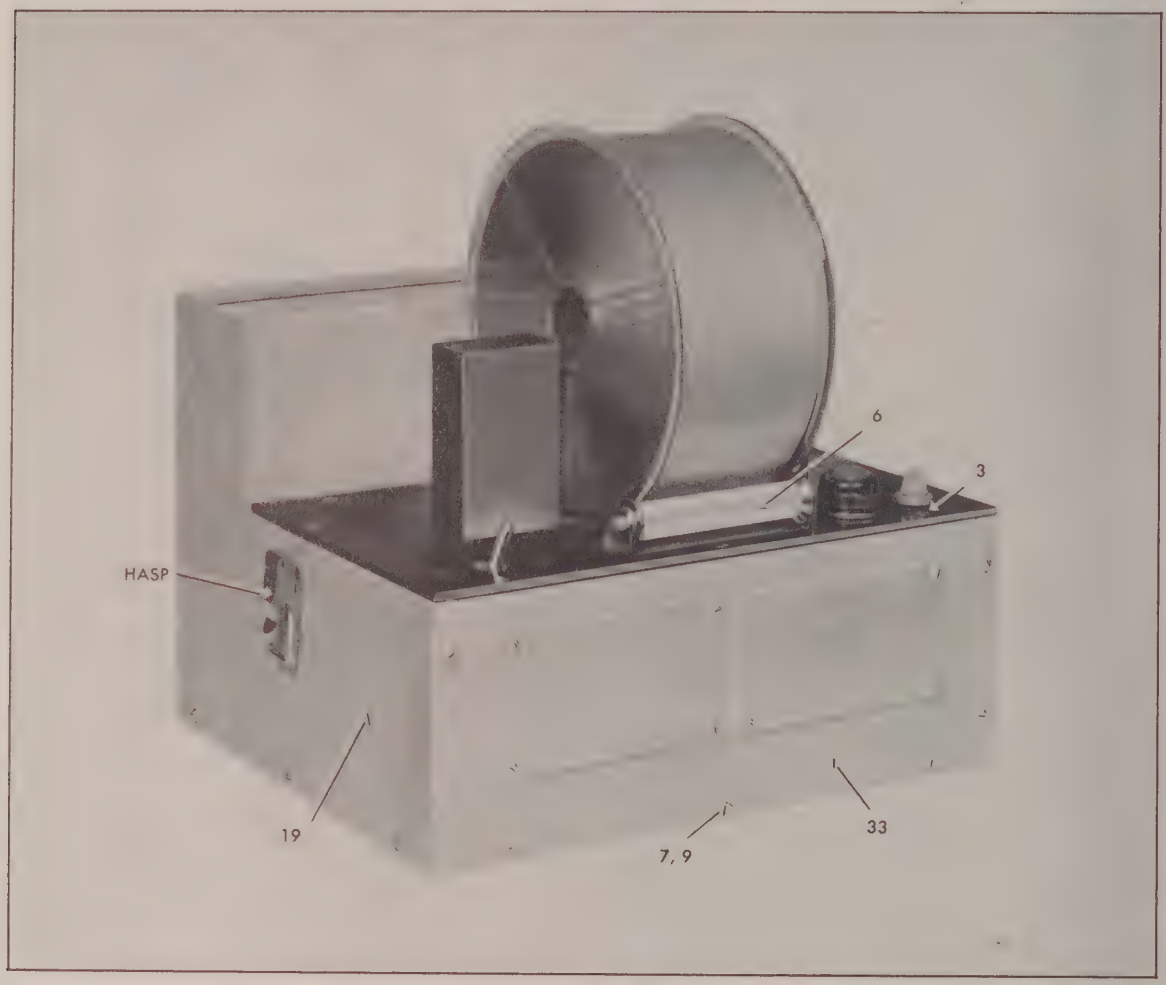
(*b*) *Front Panel.*—To remove the front panel (33), remove the seven front screws (9) and their associated lockwashers (7) and the three top screws (3) holding it in place. Removing the front panel gives access to the connection terminal board.

(*c*) *Cabinet.*—To remove the cabinet (19), the front panel (33) must be removed as described in the previous par. (b). Remove the nine screws (9) and their associated lockwashers (7) along its bottom, three on each side and three on the back. Remove the cord clamp holding the cord going to the top panel. Lift the cabinet off. It is not necessary to remove the leads to the controls unless it is desired to move the cabinet away.

(2) CAPACITOR.—Follow this procedure to replace the capacitor C-400.

(*a*) Remove the cabinet (19) as described in the previous par. 9*b* (1) (*c*).

(*b*) Remove the two leads from the terminals of the capacitor C-400.



The index numbers refer to Master Drawing S6502—3163388—*Final Assembly.*
FIG. 51 *Cabinet Replacement—Demagnetizer.*

(*c*) Tip up the Demagnetizer and remove the four screws (25) and their associated lockwashers (26) that fasten the straps holding the capacitor to the bottom chassis. See fig. 52.

(*d*) Lift out the capacitor.

(*e*) Follow the reverse procedure to install a capacitor C-400.

(*f*) Check the connections as described in par. 11*b* of Section 8.

(3) COILS.—Follow this procedure to replace either or both coils (L-400, L-401).

(*a*) Remove the cabinet (19) as described in par. 9*b* (1) (*c*).

(*b*) Remove the two screws at the front holding the connection terminal board and tip down the terminal board (31).

(*c*) Disconnect the leads of the coil to be replaced from the rear of the terminal board (31). Make a diagram of the connections so the replacement coil can be connected in the same manner.

(*d*) Pull out the wedges (41) between the field laminations and the coil.

(*e*) Pull the coil up and off the field lamination (32).

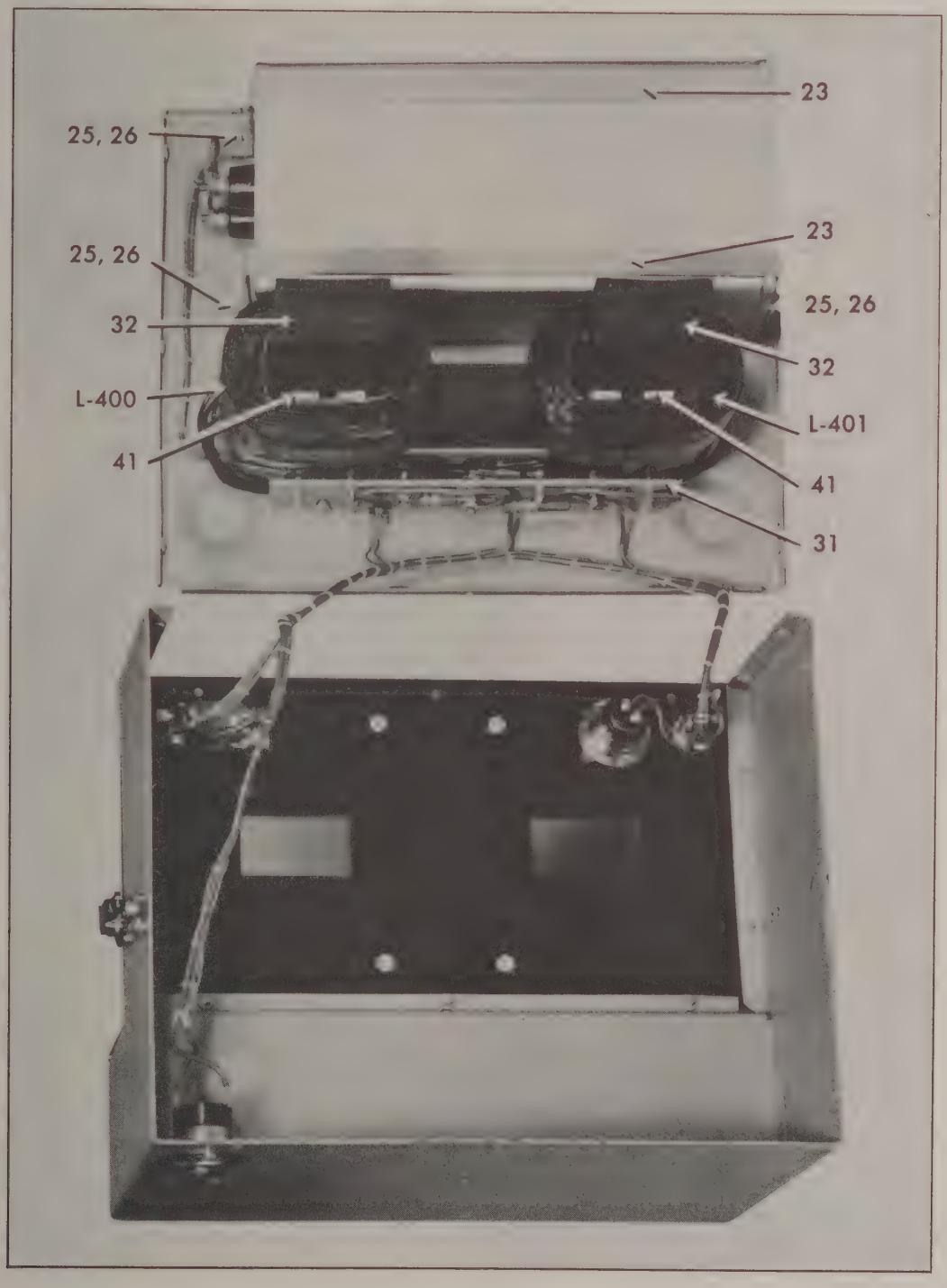
(*f*) To replace a coil follow the reverse procedure.

NOTE

Be sure to connect the leads from the coil to the proper terminals, otherwise the tests given in par. 11*b* of Section 8 will not apply.

(*g*) Check the connections as described in par. 11*b* of Section 8.

(4) ROLLERS.—The rollers (6) are held to the top panel by two screws. When these screws are removed the rollers pull off.



The index numbers refer to Master Drawing S6502—3163388—*Final Assembly.*
FIG. 52 *Component Replacement—Demagnetizer.*

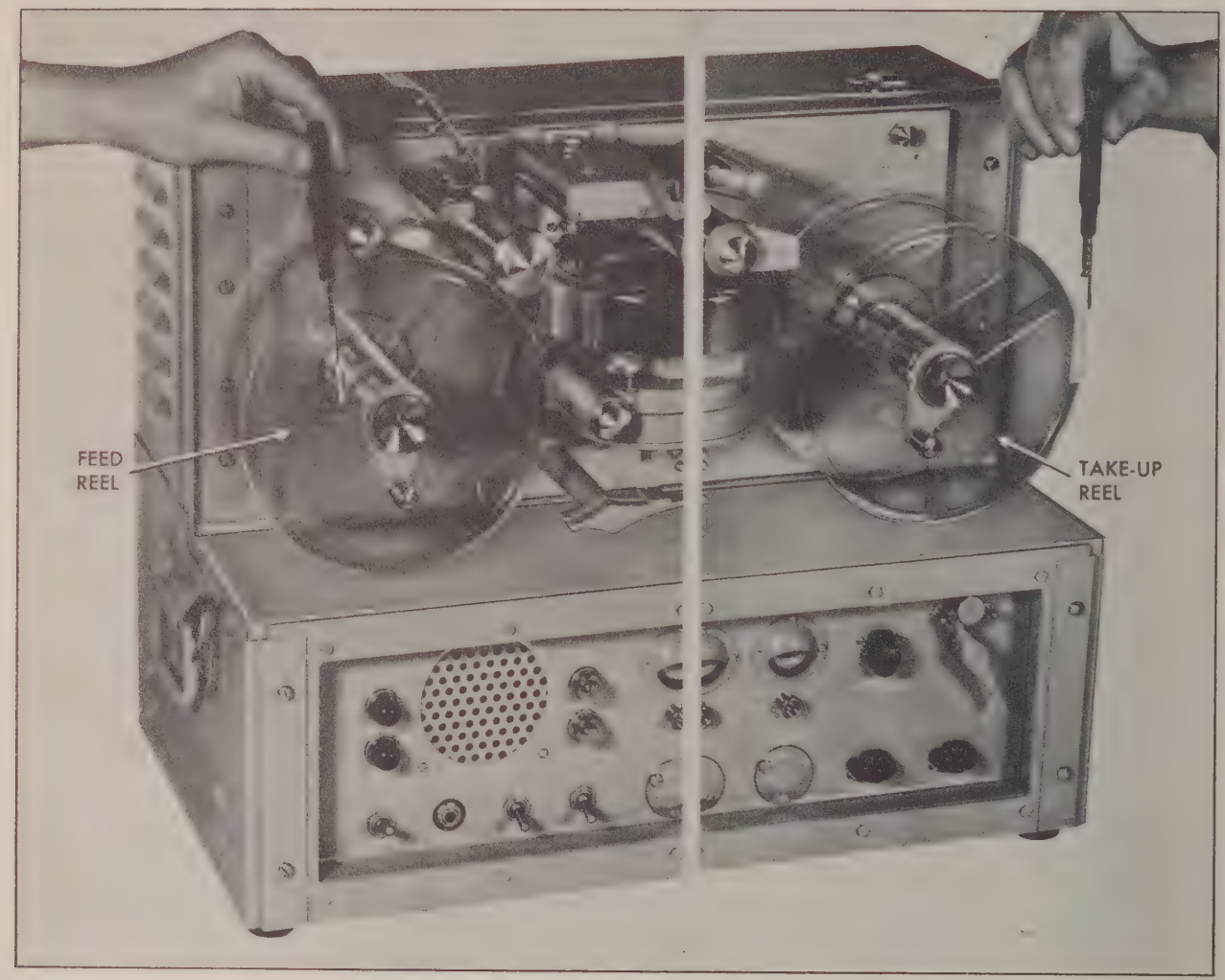


FIG. 53 *Clutch Adjustment.*

10. MECHANICAL ADJUSTMENTS.

a. TAKE-UP SPINDLE.—The clutch on the take-up (right-hand) spindle should have sufficient friction to wind up the magnetic tape but not so much friction that it drives the magnetic tape causing the magnetic tape to slip at the drive roller. To measure the clutch friction, operate the machine with the LOAD lever (111) and the SCAN lever (110) in their fully counterclockwise position. See fig. 28. Fasten the scale 8-306 with a piece of adhesive tape to the outer edge of the reel and hold the scale as shown in fig. 53. The scale should read between two and three ounces. If reading is too high, shut off machine and hold the reel with your left hand as you rotate the clutch collar (16) with your right hand in a counterclockwise direction to loosen the spring (17). See fig. 49. If reading is too low, shut off machine and hold the reel with your left hand as you rotate the clutch collar (16) with your right hand in a clockwise direction to tighten the spring (17). See fig. 49. If proper adjustment cannot be obtained, the clutch must be disassembled, cleaned, and worn or burred parts replaced and the clutch reassembled. Refer to par. 9*a* (22) of Section 8.

b. DRIVE BELT.—If the belt (2) between the drive roller and take-up spindle becomes excessively loose it must be replaced. However, there is an adjustment of the position of the idler pulley. This idler pulley is mechanically linked to the SCAN lever. The mechanical link to the idler pulley has a slotted hole. Loosening the screw and adjusting the position of the idler pulley adjusts the tension on the belt. See fig. 4 and 49.

c. FEED SPINDLE.—The feed spindle has a friction clutch with a slight amount of friction to reduce the free rotational motion of the reel. This friction should not be so great that it hinders or stops the normal alignment of the magnetic tape. To measure this clutch friction, place an empty reel on the spindle. Fasten the postal scale 8-306 with a piece of adhesive tape to the hub of the reel and hold the scale as shown in fig. 53. It should not require more than a two-ounce pull on the postal scale to rotate the reel. If the friction is excessive remove the clutch components and be sure they are free of burrs. Replace any worn or damaged components. Refer to par. 9*a* (21) of Section 8.

d. MOTOR SHAFT END THRUST.—Whenever the motor is removed and/or replaced as described in par. 9*a* (5) of Section 8, it may be necessary to adjust the end thrust of the shaft (49). See fig. 46. During normal operation the shaft thrust is toward the front. There are two conditions that occur when the thrust screw (46) is not adjusted properly. The first is when the thrust screw (46) is too far in, the motor shaft and the drive shaft (49) will butt one another and transfer motor vibration to the turntable of magnetic heads and thus the recording. If the thrust screw (46) is too far out the drive shaft (49) will chatter when the LOAD lever and SCAN lever are in their clockwise position as this shaft (49) is not thrusting hard enough against the thrust screw (46) under no load. Follow this procedure to properly adjust the thrust screw (46).

(1) Remove the cap (47).

(2) Run the machine with the LOAD lever and SCAN lever in their fully clockwise position.

(3) Loosen the locknut (45) several turns.

(4) Loosen the thrust screw (46) approximately two turns (counterclockwise).

(5) Watch the drive shaft (49) from the rear and turn in the thrust screw (46) (clockwise) until the drive shaft (49) starts to move toward the motor shaft.

(6) Turn in the thrust screw (46) another one-half turn and then tighten the locknut (45).

(7) Replace the cap nut (47).

e. GUIDE WASHERS.—If the magnetic tape should wear a groove into the side of either the guide washers (99) or (87), the respective caps (98) and (89) can be loosened and the guide washers rotated so that the magnetic tape bears against another portion of the guide washers. See fig. 48.

f. TAPE SHOE.—The screw (92) determines the position and therefore the pressure of the tape shoe (93-1) on the magnetic tape. See fig. 48. The screw (92) should be positioned so that the spring (93-7) is depressed and applying pressure on the tape shoe (93-1) when the tape shoe is down against the magnetic tape on the guide roller (100).

g. LINE-UP OF REELS.—The collars (25), one on the feed spindle and one on the take-up spindle, determine the position of the reels on their respective spindles. See fig. 49. The reels should be located in a position where the magnetic tape does not strike the sides of the reels as it leaves or goes on the reel. The position of these collars can be changed by loosening the Allen-head set screw (6) that locks it in place and rotating the collar (25) in the desired direction. The screws (6) are number six Allen-head set screws.

h. BRUSH CONTACTS.—The brush contacts (8) should not be placing excessive pressure on the magnetic tape but they should continually touch the magnetic tape. See fig. 49. The fingers of the brush contacts can be bent to the desired position.

i. HEIGHT OF GATE.—When the machine is operating, the pressure plate (118) must always keep the magnetic tape touching the top of the magnetic heads. See fig. 47. If the heads should wear down to the point where the magnetic tape is not touching the magnetic heads, the recording will be sketchy. Follow this procedure to adjust the height of the pressure gate.

(1) Operate the machine as you would for either recording or playback.

(2) Hold the screw (114) with a number eight Allen wrench as you loosen the nut (45) several turns.

(3) Brake the left-hand reel a little with your left hand to hold the magnetic tape tight against the rollers under the pressure gate (82).

(4) Adjust the screw (114) until the magnetic tape just touches the top of the magnetic heads and then turn the screw (114) one full turn counterclockwise.

(5) Tighten nut (45) as you hold screw (114) in this position.

(6) If the pressure gate (82) has to be so low that the rollers on its under side strike the turntable, the magnetic heads have worn too much and have to be replaced. Refer to pars. 9*a* (7) and (10) of Section 8.

11. ELECTRICAL ADJUSTMENTS.

a. RECORDER-REPRODUCER.

(1) SLIP RINGS AND CONTACTS.—The height of the stud (126) determines the pressure on the brush contacts to the slip rings on the underside of the turntable of magnetic heads. See fig. 44. This stud is adjusted by loosening the locknut (41) turning the stud (126) and tightening the locknut (41). Raising the stud (126) by turning it counterclockwise increases the spring pressure of the brush contacts on the slip rings. Lowering this stud (126) by turning it clockwise decreases the spring pressure. The height of this stud should be adjusted so the spring contact fingers bend downward when the brushes are brought into contact with the slip rings. To insure good electrical contact which includes proper spring pressure and clean contacts, measure the resistance of the magnetic heads through the slip ring contacts. Follow this procedure to make this check on the adjustment:

(*a*) Disconnect the magnetic heads by removing the plug P-300. See fig. 42.

(*b*) Connect an ohmmeter between terminals 2 and 5 on the plug P-300.

(*c*) Run the machine.

(*d*) As the turntable of magnetic heads rotates, the ohmmeter should read approx. 440 ohms.

(*e*) Provided the magnetic heads are not defective, the ohmmeter should show a steady reading. The needle of the meter should not flicker. If the needle of the meter flickers, it indicates dirty contacts. If the meter reads an abnormally high resistance, it indicates dirty contact or insufficient contact pressure.

(*f*) Repeat the operation with the ohmmeter connected to terminals 4 and 5 of the plug P-300.

(2) BIAS VOLTAGE.—The BIAS INDICATION lamps on the front panel glow when there is sufficient bias voltage applied to the magnetic heads. If one of these lamps is out during recording, there is trouble in its associated circuit or its associated bias amplifier stage. If both of these lamps are out during recording, there is trouble in the bias amplifier stage or the oscillator stage. The bias voltage applied to the magnetic heads of each channel may be measured by an a-c vacuum tube voltmeter connected to the proper terminals on the rear panel. To check the bias voltage to the magnetic heads of the amplifier channel number one, connect one lead of the meter to the screw

terminal designated REC. HEAD VOLTAGE AMP. 1 and connect the other lead of the meter to the screw terminal designated GND. To check the bias voltage on amplifier channel number two, connect the meter leads to the screw terminals designated GND and REC. HEAD VOLTAGE AMP. 2. When the machine is set for recording, the voltage reading should be between 57 and 65 volts. There are two potentiometers R-131 and R-231 with screwdriver slotted shafts, one for each amplifier channel, that permits adjustment of this voltage. This adjustment is not critical and the potentiometers do not permit the bias voltage to be turned completely off. Optimum results are obtained when they are adjusted to provide between 57 and 65 volts of bias voltage. Turning the controls clockwise increases the bias voltage and turning them counterclockwise decreases the bias voltage. When the bias voltage of one channel is adjusted, the bias voltage of the other channel will change. It is therefore necessary to adjust and recheck and, if necessary, readjust until they are both equal for optimum performance. If one of the components such as the oscillator coil T-302 in the oscillator stage needs to be changed or one of the components such as the tuning coil L-100 of the bias amplifier stage needs to be changed, it may be necessary to re-tune the oscillator and bias stages to obtain between 57 and 65 volts of magnetic bias. Follow this procedure to re-tune these stages:

(*a*) Connect a vacuum tube voltmeter and the vertical terminals of an oscilloscope to the GND terminal and the REC. HEAD VOLTAGE AMP. 1 terminal on the rear panel.

(*b*) Connect a signal generator capable of generating 20,000 cycles to the horizontal terminals of the oscilloscope.

(*c*) Turn the machine on and place the PLAYBACK-RECORD SELECTOR in the RECORD position.

(*d*) Adjust the oscilloscope so that the bias voltage frequency is beating against the frequency from the signal generator.

(*e*) Adjust the core of the coil T-302 to provide a circle on the oscilloscope indicating that the frequency from the bias oscillator stage is the same frequency (20,000 cycles) from the signal generator.

(*f*) Carefully adjust the core of the coil L-100 to give a maximum voltage reading.

(*g*) Adjust the potentiometer R-131 to give a voltage reading between 57 and 65 volts.

(*h*) Repeat steps (*f*) and (*g*) with the vacuum tube voltmeter connected to the GND terminal and the REC. HEAD VOLTAGE AMP. 2 terminal on the rear panel except in step (*f*) adjust the coil L-200 to give a maximum voltage reading and in step (*g*), use the potentiometer R-231 to give a reading between 57 and 65 volts.

(*i*) When the bias voltage of one channel is adjusted, the bias voltage of the other channel will change. It is therefore necessary to adjust, recheck and if necessary readjust until the bias voltage of each channel is between 57 and 65 volts for optimum performance.

b. DEMAGNETIZER.—Whenever the capacitor C-400 and/or one of the coils L-400 and L-401 are replaced, the proper connections must be made to insure adequate voltage and magnetic flux for the demagnetizing process. Follow this procedure to make proper connections.

WARNING

The voltages to be measured will be approximately 900 volts. Be sure to follow these instructions to avoid any casualty.

(1) Disconnect the power cord from the wall outlet.

(2) Remove the front panel as described in par. 9*b* (1) (*b*) of Section 8.

(3) Connect a voltmeter to the terminals marked "X" in fig. 54.

(4) Adjust the meter so it is capable of measuring 1200 volts, a-c.

(5) Connect the power cord to the wall outlet and socket on the back of the Demagnetizer.

(6) Hold the ON-OFF switch S-400 in the ON position. Read the voltage on the meter and immediately release the ON-OFF switch S-400. The meter should not read less than 950 volts.

(7) There are three possible connections for each coil. The lead A should be connected to either terminal designated A-1, A-2 or A-3 in fig. 54. The lead B should be connected to either terminal designated B-1, B-2 or B-3. The proper terminal connection must be chosen to obtain sufficient voltage when the coils and capacitor are in resonance. If the voltage reading is below 950 volts continue with these steps to obtain proper voltage. Stop when sufficient voltage is obtained.

(8) Remove the lead A from its present terminal and connect to terminal A-3.

(9) Remove the lead B from its present terminal and connect to terminal B-3.

(10) Measure the voltage. If the voltage is below 950 volts continue with the following steps.

(11) Connect lead A to terminal A-2.

(12) Measure voltage. If voltage is still below 950 continue with the following steps.

(13) Connect lead B to terminal B-2.

(14) Measure voltage. If voltage is still below 950 continue with the following steps.

(15) Connect lead A to terminal A-1.

(16) Measure voltage. If voltage is still below 950 continue with the following steps.

(17) Connect lead B to terminal B-1.

(18) Measure voltage. If the voltage is still below 950, the line voltage is exceedingly low or the coils or capacitor are defective.

NOTE

If this test is made at a high line voltage and the Demagnetizer is used at a lower line voltage, there may not be sufficient voltage to light the pilot lamp I-400 and erase the magnetic tape. Under these conditions, this test setup must be made with the same line voltage at which the Demagnetizer will be used.

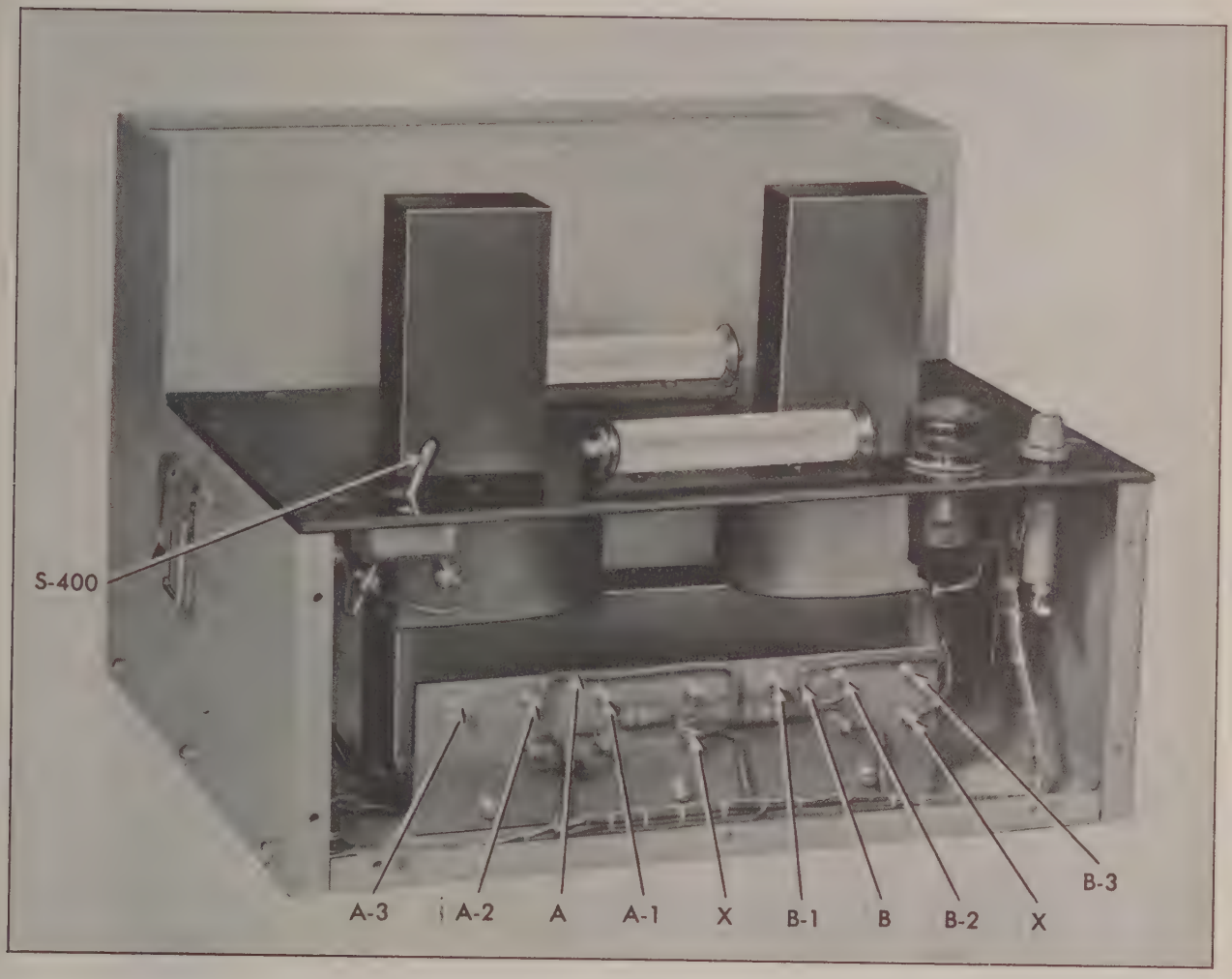


FIG. 54 *Connection Adjustment—Demagnetizer.*

SECTION 9

Parts Identification

ELECTRICAL REPLACEMENT PARTS LIST
LIST OF MANUFACTURERS
SPECIAL TOOLS
MASTER DRAWINGS
MEMORANDA PAGES

ELECTRICAL REPLACEMENT PARTS LIST

SYMBOL DESIG.	FIG. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	JAN TYPE NO.	NAVY STOCK NO.	MFG.	MFG'S DESIG.	SOUND-SCRIBER DESIG.	ALL SYMBOL DESIG. INVOLVED
B-300	4	Motor, Synchronous	Drive turntable and magnetic tape			1	5SH13DG1	9011	
C-100	35	Capacitor, .0047 mfd.	Frequency compensation during recording	CM35D472K				C-316	C-100, C-106, C-111, C-113, C-200, C-206, C-211, C-213
C-101	35	Capacitor, 50 mfd.	Cathode by-pass	CE63B500F				C-307	C-101, C-104, C-108, C-201, C-204, C-208, C-307, C-310
C-102	34	Capacitor, .05-.05 mfd.	Screen grid by-pass	CP69B4DF503L	H16C53002-4246			C-308	C-102, C-202
C-103	35	Capacitor, .05 mfd.	Coupling	CP27A1DF503M	H16C44287-6664			C-309	C-103, C-109, C-203, C-209, C-309, C-313
C-104	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-105	35	Capacitor, .00047 mfd.	Screen grid by-pass	CM25D471K				C-310	C-105, C-110, C-114, C-205, C-210, C-214, C-306
C-106	35	Capacitor, .0047 mfd.	Coupling	See C-100					
C-107	35	Capacitor, .002 mfd.	Frequency compensation	CM30D202J				C-311	C-107, C-207
C-108	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-109	35	Capacitor, .05 mfd.	Coupling	See C-103					
C-110	35	Capacitor, .00047 mfd.	Frequency compensation	See C-105					
C-111	34	Capacitor, .0047 mfd.	Coupling	See C-100					
C-112	34	Capacitor, .0022 mfd.	Frequency compensation	CM30D222K				C-315	C-112, C-212, C-303
C-113	35	Capacitor, .0047 mfd.	Coupling	See C-100					
C-114	35	Capacitor, .00047 mfd.	Frequency compensation	See C-105					
C-115	35	Capacitor. .01 mfd.	Tuning	CP27A1DF103M	H16C42767-5651			C-318	C-115, C-215, C-304, C-308
C-200	35	Capacitor, .0047 mfd.	Frequency compensation during recording	See C-100					
C-201	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-202	34	Capacitor, .05-.05 mfd.	Screen grid by-pass	See C-102					
C-203	35	Capacitor, .05 mfd.	Coupling	See C-103					
C-204	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-205	35	Capacitor, .00047 mfd.	Screen grid by-pass	See C-105					
C-206	35	Capacitor, .0047 mfd.	Coupling	See C-100					
C-207	35	Capacitor, .002 mfd.	Frequency compensation	See C-107					
C-208	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-209	35	Capacitor, .05 mfd.	Coupling	See C-103					
C-210	35	Capacitor, .00047 mfd.	Frequency compensation	See C-105					
C-211	34	Capacitor, .0047 mfd.	Coupling	See C-100					
C-212	34	Capacitor, .0022 mfd.	Frequency compensation	See C-112					
C-213	35	Capacitor, .0047 mfd.	Coupling	See C-100					

ELECTRICAL REPLACEMENT PARTS LIST (CONT.)

SYMBOL DESIG.	FIG. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	JAN TYPE NO.	NAVY STOCK NO.	MFG.	MFG'S DESIG.	SOUND-SCRIBER DESIG.	ALL SYMBOL DESIG. INVOLVED
C-214	35	Capacitor, .00047 mfd.	Frequency compensation	See C-105					
C-215	35	Capacitor, .01 mfd.	Tuning	See C-115					
C-300	34	Capacitor, 40-40 mfd.	B supply filter	CE32E400R	H16C22000-7876			C-306	C-300A, C-300B
C-301	34	Capacitor, 45-45 mfd.	B supply filter	C32B450Q	H16C220220-6120			C-314	C-301A, C-301B, C-302A, C-302B
C-302	34	Capacitor. 45-45 mfd.	B supply filter	See C-301					
C-303	35	Capacitor, .0022 mfd.	Coupling	See C-112					
C-304	35	Capacitor, .01 mfd.	Feedback	See C-115					
C-305	35	Capacitor, .1 mfd.	Blocking	CP69B1DF104X	H16C45814-9322			C-317	
C-306	35	Capacitor, .00047 mfd.	Coupling	See C-105					
C-307	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-308	35	Capacitor, .01 mfd.	Screen grid by-pass	See C-115					
C-309	35	Capacitor, .05 mfd.	Coupling	See C-103					
C-310	35	Capacitor, 50 mfd.	Cathode by-pass	See C-101					
C-311	34	Capacitor, .25 mfd.	Feedback	CP65B1DF254V				C-312	
C-312	34	Capacitor, .05 mfd.	Cathode by-pass	CP65B1DF503V				C-302	
C-313	34	Capacitor, .05 mfd.	By passes buzzer contacts	See C-103					
C-400	52	Capacitor, 12 mfd., 1330 volts a-c	Provides series resonance with coils			13	KG-124	C-313	
E-100	45	Magnetic Head Assembly	Recording and playback heads		H17H39209-2501	2	9192A	9192A	E-100, E-200
E-200	45	Magnetic Head Assembly	Recording and playback heads	See E-100					
E-201	4	Tone Generator	Generates signal tone to identify recordings on channel 2			2	9390A	9390A	
E-300	3	End-of-tape Contact Assembly	When contacts shorted RE-LOAD WARNING lamp I-301 glows and buzzer I-302 operates		H17C84151-3030	2	9201A	9201A	
F-300	16	Fuse	Protect machine		G17F16302-120	3	312003	Z-308	
F-400	30	Fuse	Protect demagnetizer		H17F14327-30	3	314010	Z-318	
I-100	28	Lamp, neon	Bias Indication		G17-L-6806-130	1	NE-51	V-313	I-100, I-200
I-200	28	Lamp, neon	Bias Indication	See I-100					
I-300	28	Lamp, 12-16 volt, .2 amp. Incandescent	POWER ON lamp		H17L6543-200	1	1815	V-319	
I-301	28	Lamp, 6 volt, .15 amp. Incandescent	RELOAD WARNING lamp	See I-300	G17-L-6297	1	47	V-300	
I-302	9	Buzzer Assembly	Audible reload warning			2	9399A	9399A	
I-400	30	Lamp, Neon	On-off indication			1	NE-48	V-315	
J-100	28	Connector, 3-contact, male, recessed panel mounting	Microphone input connection			2	J-301	J-301	J-100, J-201
J-200	34	Connector, 3-contact, female panel mounting	Connects tone generator E-200 to amplifier chassis		H17C73162-6056	4	S303AB	9-1548	J-200, J-304

J-201	28	Connector, 3-contact, male, recessed panel mounting	Microphone input connection	See J-100					
J-300	34	Connector, 6-contact, male, panel mounting	Connects magnetic heads to amplifier chassis			4	P306AB	J-315	
J-301	34	Connector, 4-contact, female, panel mounting	Connects motor to amplifier chassis			4	S304AB	9-1551	
J-302	35	Connector, 2-contact, male, recessed panel mounting	Connects power to machine			5	7466	J-309	J-302, J-400
J-303	28	Phone jack	Playback and monitor output jack						
J-304	16	Connector, 3-contact, female, panel mounting	Connects motor to mechanical chassis	See J-200					
J-400	27	Connector, 2-contact, male, recessed panel mounting	Connects power to Demagnetizer	See J-302					
K-300	4	Relay, current, single pole, normally open contacts	Motor starting relay			11	9125274	Z-310	K-300A, K-300B
K-301	35	Relay, 6 volt a-c coil, double pole, normally open contacts	Reload warning relay			12	KR7A	Z-306	K-301A, K-301B, K-301C
K-302	35	Relay, 40 volt d-c coil, single pole, normally closed contacts	Power failure relay			12	KR-1635-1	Z-309	K-302A, K-302B
L-100	34	Tuning coil	Tuning bias amplifier			6		L-307	L-100, L-200
L-200	34	Tuning coil	Tuning bias amplifier	See L-100					
L-400	52	Coil, tapped	Erase tape			2	9219	9219	L-400, L-401
L-401	52	Coil, tapped	Erase tape						
P-200	42	Connector, 3-contact, male, cord connector	Connects tone generator E-200 to amplifier chassis		H17C1460-8508	4	P303CCT	9-1547	P-200, P-304
P-300	42	Connector, 6-contact, female, cord connector	Connects magnetic heads to amplifier chassis			4	S306CCT	J-316	
P-301	42	Connector, 4-contact, male, cord connector	Connects motor to amplifier chassis			4	P304CCT	9-1552	
P-302	16	Connector, 2-contact, female, cord connector	Connects power to machine			5	7464	J-310	P-302, P-400
P-303	16	Connector, 2-contact, male, molded to cord	Connects to wall outlet						P-303, P-401
P-304	43	Connector, 3-contact, male, cord connector	Connects motor to mechanical chassis	See P-200					
P-400	27	Connector, 2-contact, female, cord connector	Connects power to Demagnetizer	See P-302					
P-401	27	Connector, 2-contact, male, molded to cord	Connects to wall outlet	See P-303					
R-100	19	Resistor, 12K ohms ± 10%, ½ watt	Impedance matching of line input	RC20BF123K				R-316	R-100, R-200, R-301, R-312, R-317
R-101	19	Resistor, 2700 ohms ± 10%, ½ watt	Impedance matching of line input	RC20BF272K				R-312	R-101, R-102, R-201, R-202
R-102	19	Resistor, 2700 ohms ± 10%, ½ watt	Impedance matching of line input	See R-101					
R-103	19	Resistor, 270 ohms ± 10%, ½ watt	Provides center tap for line input	RC20BF271K				R-306	R-103, R-104, R-203, R-204
R-104	19	Resistor, 270 ohms ± 10%, ½ watt	Provides center tap for line input	See R-103					

ELECTRICAL REPLACEMENT PARTS LIST (CONT.)

SYMBOL DESIG.	FIG. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	JAN TYPE NO.	NAVY STOCK NO.	MFG.	MFG'S DESIG.	SOUND-SCRIBER DESIG.	ALL SYMBOL DESIG. INVOLVED
R-105	35	Resistor, 220K ohms ± 10%, ½ watt	Grid resistor	RC20BF224K				R-322	R-105, R-112, R-127, R-205, R-212, R-227, R-123, R-223
R-106	35	Resistor, 15K ohms ± 5%, ½ watt	Grid resistor	RC20BF153J				R-336	R-106, R-206
R-107	35	Resistor, 36K ohms ± 5%, ½ watt	Grid resistor	RC20BF363J				R-366	R-107, R-207
R-108	34	Resistor, 5 ohms ± 5%, 8 watt	Heater resistor	RW30G5RO				R-332	R-108, R-208
R-109	35	Resistor, 1500 ohms ± 10%, ½ watt	Cathode resistor	RC20BF152K				R-310	R-109, R-209, R-316
R-110	35	Resistor, 240K ohms ± 5%, ½ watt	Feedback resistor	RC20BF244J				R-323	R-110, R-210
R-111	35	Resistor, 1.2 megohms ± 10%, ½ watt	Screen grid resistor	RC20BF125K				R-326	R-111, R-126, R-211, R-226, R-305
R-112	35	Resistor, 220K ohms ± 10%, ½ watt	Plate load resistor	See R-105					
R-113	34	Potentiometer, 500K ohms, slotted shaft	RECORD VOLUME control			7	G16208	R-343	R-113, R-213
R-114	35	Resistor, 3900 ohms ± 10%, ½ watt	Cathode resistor	RC20BF392K				R-314	R-114, R-214
R-115	35	Resistor, 300K ohms ± 5% ½ watt	Screen grid resistor	RC20BF304J				R-324	R-115, R-215
R-116	35	Resistor, 100K ohms ± 10%, ½ watt	Plate load resistor	RC20BF104K				R-320	R-116, R-121, R-129, R-216, R-221, R-229, R-232, R-309, R-402
R-117	35	Resistor, 62K ohms ± 5% ½ watt	Tone control resistor	RC20BF623J				R-365	R-117, R-217
R-118	35	Potentiometer, 500K ohms, round shaft	PLAYBACK VOLUME control			7	G16210-1	R-342	R-118, R-218
R-119	35	Resistor, 470 ohms ± 10%, ½ watt	Cathode resistor	RC20BF471K				R-337	R-119, R-219, R-306
R-120	34	Resistor, 12K ohms ± 5%, 30 watt	Plate load resistor	RW34G123				R-317	R-120, R-220
R-121	35	Resistor, 100K ohms ± 10%, ½ watt	Grid resistor	See R-116					
R-122	35	Resistor, 47K ohms ± 10%, ½ watt	Voltage attenuator	RC20BF473K				R-318	R-122, R-124, R-222, R-224, R-132, R-233
R-123	35	Resistor, 220K ohms ± 10%, ½ watt	Grid resistor	See R-105					
R-124	34	Resistor, 47K ohms ± 10%, ½ watt	Grid resistor	See R-122					

R-125	22	Resistor, 470K ohms ± 10%, ½ watt	Grid resistor	RC20BF474K				R-325	R-125, R-130, R-225, R-230, R-308, R-310, R-319
R-126	22	Resistor, 1.2 megohms ± 10%, ½ watt	Plate load resistor	See R-111					
R-127	35	Resistor, 220K ohms ± 10%, ½ watt	Voltage attenuator	See R-105					
R-128	35	Resistor, 1.5 megohms ± 10%, ½ watt	Voltage attenuator	RC20BF155K				R-351	R-128, R-228
R-129	35	Resistor, 100K ohms ± 10%, ½ watt	Voltage attenuator	See R-116					
R-130	25	Resistor, 470K ohms ± 10%, ½ watt	Voltage attenuator	See R-125					
R-131	35	Potentiometer, 100K ohms, slotted shaft	BIAS VOLTAGE control			7	G16209	R-344	R-131, R-231
R-132	23	Resistor, 47K ohms ± 10%, ½ watt	Prevents bias control from being turned all the way off	See R-122					
R-200	19	Resistor, 12K ohms ± 10%, ½ watt	Impedance matching of line input	See R-100					
R-201	19	Resistor, 2700 ohms ± 10%, ½ watt	Impedance matching of line input	See R-101					
R-202	19	Resistor, 2700 ohms ± 10%, ½ watt	Impedance matching of line input	See R-101					
R-203	19	Resistor, 270 ohms ± 10%, ½ watt	Provides center tap for line input	See R-103					
R-204	19	Resistor, 270 ohms ± 10%, ½ watt	Provides center tap for line input	See R-103					
R-205	35	Resistor, 220K ohms ± 10%, ½ watt	Grid resistor	See R-105					
R-206	35	Resistor, 15K ohms ± 10%, ½ watt	Grid resistor	See R-106					
R-207	35	Resistor, 36K ohms ± 5%, ½ watt	Grid resistor	See R-107					
R-208	34	Resistor, 5 ohms ± 5%, 8 watt	Heater resistor	See R-108					
R-209	35	Resistor, 1500 ohms ± 10%, ½ watt	Cathode resistor	See R-109					
R-210	35	Resistor, 240K ohms ± 5%, ½ watt	Feedback resistor	See R-110					
R-211	35	Resistor, 1.2 megohms ± 10%, ½ watt	Screen grid resistor	See R-111					
R-212	35	Resistor, 220K ohms ± 10%, ½ watt	Plate load resistor	See R-105					
R-213	34	Potentiometer, 500K ohms, slotted shaft	RECORD VOLUME control	See R-113					
R-214	35	Resistor, 3900 ohms ± 10%, ½ watt	Cathode resistor	See R-114					
R-215	35	Resistor, 300K ohms ± 5%, ½ watt	Screen grid resistor	See R-115					
R-216	35	Resistor, 100K ohms ± 10%, ½ watt	Plate load resistor	See R-116					
R-217	35	Resistor, 62K ohms ± 10%, ½ watt	Tone control resistor	See R-117					

ELECTRICAL REPLACEMENT PARTS LIST (CONT.)

SYMBOL DESIG.	FIG. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	JAN TYPE NO.	NAVY STOCK NO.	MFG.	MFG'S DESIG.	SOUND-SCRIBER DESIG.	ALL SYMBOL DESIG. INVOLVED
R-218	35	Potentiometer, 500K ohms, round shaft	PLAYBACK VOLUME control	See R-118					
R-219	35	Resistor, 470 ohms ± 10%, ½ watt	Cathode resistor	See R-119					
R-220	34	Resistor, 12K ohms ± 5%, 30 watt	Plate load resistor	See R-120					
R-221	35	Resistor, 100K ohms ± 10%, ½ watt	Grid resistor	See R-116					
R-222	35	Resistor, 47K ohms ± 10%, ½ watt	Voltage attenuator	See R-122					
R-223	35	Resistor, 220K ohms ± 10%, ½ watt	Grid resistor	See R-105					
R-224	34	Resistor, 47K ohms ± 10%, ½ watt	Grid resistor	See R-122					
R-225	22	Resistor, 470K ohms ± 10%, ½ watt	Grid resistor	See R-125					
R-226	22	Resistor, 1.2 megohms ± 10%, ½ watt	Plate load resistor	See R-111					
R-227	35	Resistor, 220K ohms ± 10%, ½ watt	Voltage attenuator	See R-105					
R-228	35	Resistor, 1.5 megohms ± 10%, ½ watt	Voltage attenuator	See R-128					
R-229	35	Resistor, 100K ohms ± 10%, ½ watt	Voltage attenuator	See R-116					
R-230	25	Resistor, 470K ohms ± 10%, ½ watt	Voltage attenuator	See R-125					
R-231	35	Potentiometer, 100K ohms, slotted shaft	BIAS VOLTAGE control	See R-131					
R-232	35	Resistor, 100K ohms ± 10%, ½ watt	Impedance matching for tone generator	See R-116					
R-233	23	Resistor, 47K ohms, ± 10%, ½ watt	Prevents bias control from being turned all the way off	See R-122					
R-300	34	Resistor, 2500 ohms ± 5%, center tapped, 16.2 watts	B supply filter	RW33G252T				R-313	R-300A, R-300B
R-301	35	Resistor, 12K ohms ± 10%, ½ watt	B supply filter	See R-100					
R-302	35	Resistor, 1500 ohms ± 10%, 2 watt	B supply filter	RC41BE152K				R-352	R-301
R-303	35	Resistor, 500 ohms ± 10%, 8 watt	B supply filter	RW30G501				R-308	R-303, R-304
R-304	35	Resistor, 500 ohms ± 10%, 8 watt	B supply filter	See R-303					
R-305	35	Resistor, 1.2 megohms ± 10%, ½ watt	Grid resistor	See R-111					
R-306	35	Resistor, 470 ohms ± 10%, ½ watt	Cathode resistor	See R-119					

R-307	25	Resistor, 62 ohms ± 5%, ½ watt	Cathode resistor	RU3C620J				R-304	R-307
R-308	35	Resistor, 470K ohms ± 10%, ½ watt	Screen grid resistor	See R-125					
R-309	25	Resistor, 100K ohms ± 10%, ½ watt	Plate load resistor	See R-116					
R-310	26	Resistor, 470K ohms ± 10%, ½ watt	Grid resistor	See R-125					
R-311	35	Resistor, 220 ohms ± 10%, 2 watts	Cathode resistor	RW30G221				R-339	R-311
R-312	35	Resistor, 12K ohms ± 10%, ½ watt	Screen grid resistor	See R-100					
R-313	26	Resistor, 7500 ohms ± 5%, ½ watt	Feedback resistor	RC20BF752J				R-315	R-313
R-314	35	Resistor, 1K ohm ± 5%, ½ watt	Feedback resistor	RC20BF102J				R-309	R-314
R-315	35	Resistor, 12 ohms ± 5%, 8 watt	Output loading resistor	RW30G120				R-303	R-315
R-316	24	Resistor, 1500 ohms ± 10%, ½ watt	Cathode resistor	See R-109					
R-317	35	Resistor, 12K ohms ± 10%, ½ watt	Grid resistor	See R-100					
R-318	35	Resistor, 10K ohms ± 10%, 2 watt	Plate load resistor	RC41BE103K				R-353	R-318
R-319	23	Resistor, 470K ohms ± 10%, ½ watt	Grid resistor	See R-125					
R-400	27	Resistor, 22K ohms ± 10%	Bleeder resistor	RC41BE223K				R-348	
R-401	27	Resistor, 470K ohms ± 10%	Attenuator	RC30BF474K				R-347	
R-402	27	Resistor, 100K ohms ± 10%, ½ watt	Attenuator	See R-116					
S-300	28	Switch, double-pole, single throw, toggle	POWER ON OFF switch	ST22K	H17S73082-9028			G-300	S-300, S-301
S-301	28	Switch, double-pole, single throw, toggle	MOTOR ON OFF switch	See S-300					
S-302	28	Switch, single-pole, normally closed, spring return, toggle	WARNING RESET switch	ST12B	H17S70778-4284			G-302	S-302
S-303	28	Switch, three position rotary wafer type, three switching sections	PLAYBACK CHANNEL SELECTOR switch		H17S62122-4894	8	4967-4MLW-1	G-308	S-303
S-304	28	Switch, three position rotary wafer type, 8 wafers mechanically ganged together, three switching sections per wafer	PLAYBACK RECORD SELECTOR switch		H17S67100-6189	8	4969-4MLW-8	G-301	S-304
S-400	30	Switch, single pole, normally open, spring return, toggle	Demagnetizer on-off switch	ST45C	H17CUT-12536			G-309	S-400
T-100	34	Transformer, input, 600 ohms primary and 85K ohms secondary impedance	Input transformer			9	HS-1	L-300	T-100, T-200

ELECTRICAL REPLACEMENT PARTS LIST (CONT.)

SYMBOL DESIG.	FIG. NO.	NAME OF PART AND DESCRIPTION	FUNCTION	JAN TYPE NO.	NAVY STOCK NO.	MFG.	MFG'S DESIG.	SOUND-SCRIBER DESIG.	ALL SYMBOL DESIG. INVOLVED
T-200	34	Transformer, input, 600 ohms primary and 85K ohms secondary impedance	Input transformer	See T-100					
T-300	34	Transformer, Power 110V, 60 cycle, single phase primary winding; 700V, 120 ma., center tapped secondary; 5V, 2 amps secondary; 6.3V, 5 amps secondary	Power transformer		H17T75011-9677	9	HS-207	L-302	T-300
T-301	34	Transformer, output; 5K ohms primary; 500 ohms and 3.2 ohms secondary	Output transformer		H17T64538-4891	10	252A12	L-301	T-301
T-302	34	Transformer, variable magnetic core	Oscillator coil			6	ES-411	L-306	T-302
V-100	34	Tube, Electronic, 6SJ7, selected as non-microphonic	First stage audio voltage amplifier of amplifier channel one	6SJ7	N16-T-56665			V-316	V-100, V-200
V-101	34	Tube, electron, 6SJ7	Second stage audio voltage amplifier of amplifier channel one	6SJ7	N16-T-56665			V-301	V-101, V-201, V-304
V-102	34	Tube, electron, 6V6GT	Output stage for recording amplifier channel one	6V6GT	N16-T-56758			V-302	V-102, V-202, V-305
V-103	34	Tube, Electron Ray, 6E5	RECORD VOLUME indicator for amplifier channel one	6E5	N16-T-56255			V-309	V-103, V-203
V-200	34	Tube, Electron, 6SJ7, selected as non-microphonic	First stage audio voltage amplifier of amplifier channel two	See V-100					
V-201	34	Tube, Electron, 6SJ7	Second stage audio voltage amplifier of amplifier channel two	See V-101					
V-202	34	Tube, Electron, 6V6GT	Output stage for recording amplifier channel two	See V-102					
V-203	34	Tube, Electron Ray, 6E5	RECORD VOLUME indicator for amplifier channel two	See V-103					
V-300	34	Tube, Electron, 12AU7	Bias Amplifier	12AU7	N16-T-58241			V-317	V-300A, V-300B
V-301	34	Tube, Electron, 6C4	Bias oscillator	6C4	N16-T-56214			V-303	V-301
V-302	34	Tube, Electron, 5Y3GT	Rectifier	5Y3GT	N16-T-55735			V-304	V-302, V-303
V-303	34	Tube, Electron, 5Y3GT	Rectifier	See V-302					
V-304	34	Tube, Electron, 6SJ7	Third stage audio voltage amplifier for playback	See V-101					
V-305	35	Tube, Electron, 6V6GT	Output stage for playback and monitor	See V-102					

LIST OF MANUFACTURERS

Reference Number	*Name*	*Address*
1	General Electric Company	1285 Boston Avenue Bridgeport 8, Connecticut
2	The SoundScriber Corporation	146 Munson Street New Haven, Connecticut
3	Littelfuse, Incorporated	4757 North Ravenswood Chicago 40, Illinois
4	Cinch Manufacturing Corporation	1026 South Homan Avenue Chicago 22, Illinois
5	Harvey Hubbell, Incorporated	State and Bostwick Avenues Bridgeport, Connecticut
6	Cambridge Thermionic Corporation	439 Concord Avenue Cambridge 38, Massachusetts
7	Chicago Telephone Supply Corp.	Elkhart, Indiana
8	Grigsby-Allison Company, Inc.	407 North Salem Avenue Arlington Heights, Illinois
9	Triad Transformer Manufacturing Co.	2254 Sepulveda Boulevard Los Angeles 64, California
10	Standard Transformer Corporation	Elston, Kedzie & Addison Chicago 18, Illinois
11	R-B-M Manufacturing Co., Div. of Essex Wire Corp.	Fort Wayne, Indiana
12	Potter & Brumfield Mfg. Co.	Princeton, Indiana
13	Cornell Dubilier	South Plainfield, New Jersey

SPECIAL TOOLS

The following special tools are required for adjustment and repair of the Recorder-Reproducer. See fig. 55.

1. Non-magnetic Screwdriver
2. No. 4 Allen Wrench
3. No. 6 Allen Wrench
4. No. 8 Allen Wrench
5. 8 oz. Postal Scale

These tools are shipped in the Maintenance Kit, however, a convenient place of storage is the storage compartment of the Demagnetizer. The non-magnetic screwdriver should be used whenever any repair work is done on the turntable of magnetic heads. The Allen wrenches are required for the set screws used in the machine. The postal scale must be used for checking the clutch tensions. Refer to pars. 10*a* and *c* of Section 8.

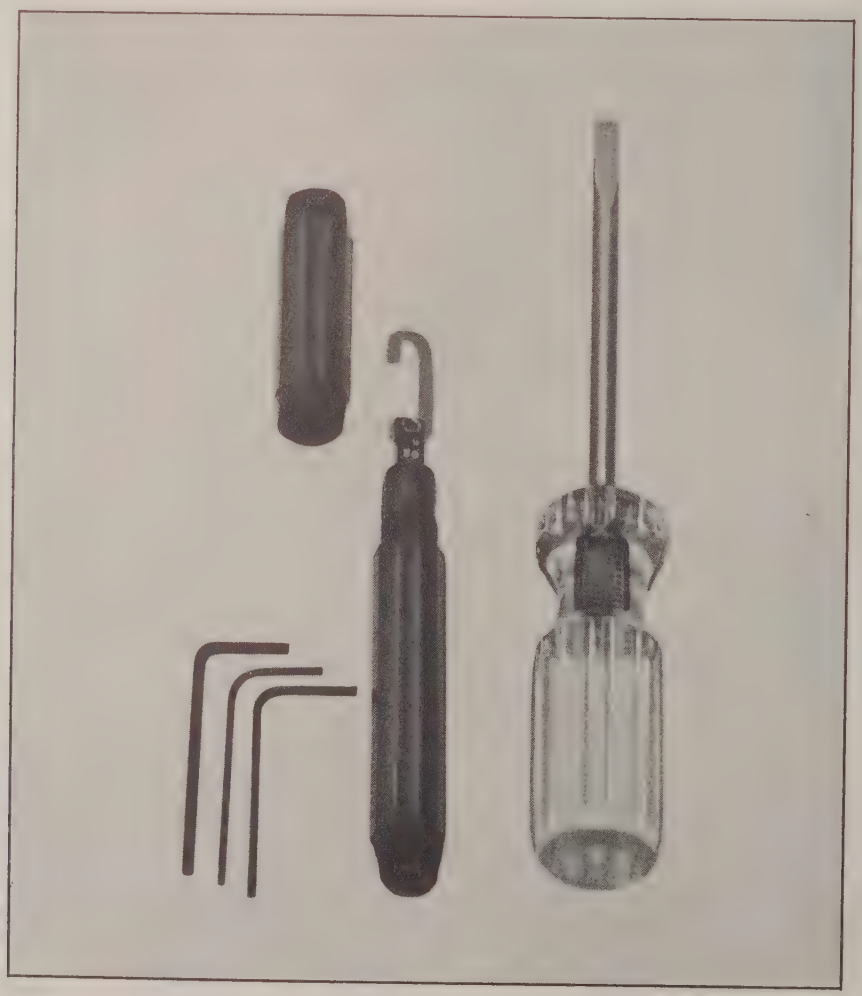
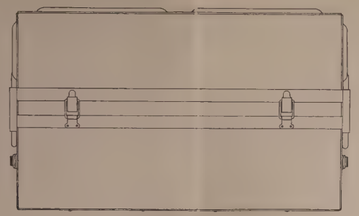
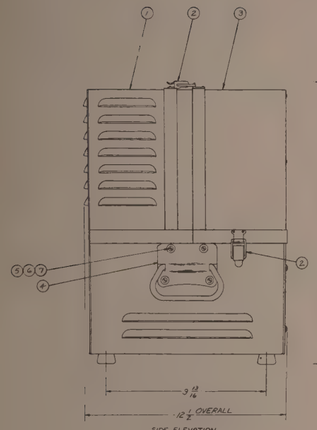


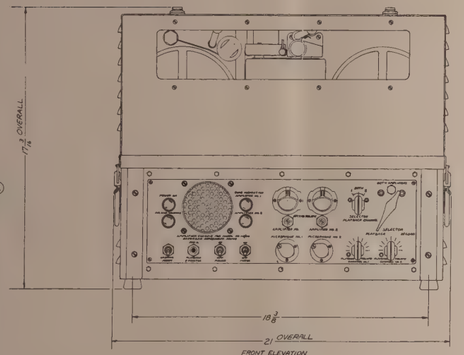
FIG. 55 *Special Tools.*



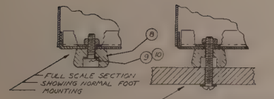
PLAN VIEW



SIDE ELEVATION

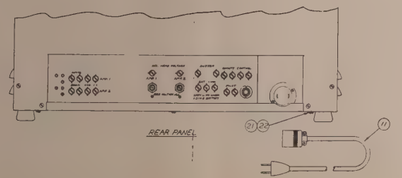


FRONT ELEVATION

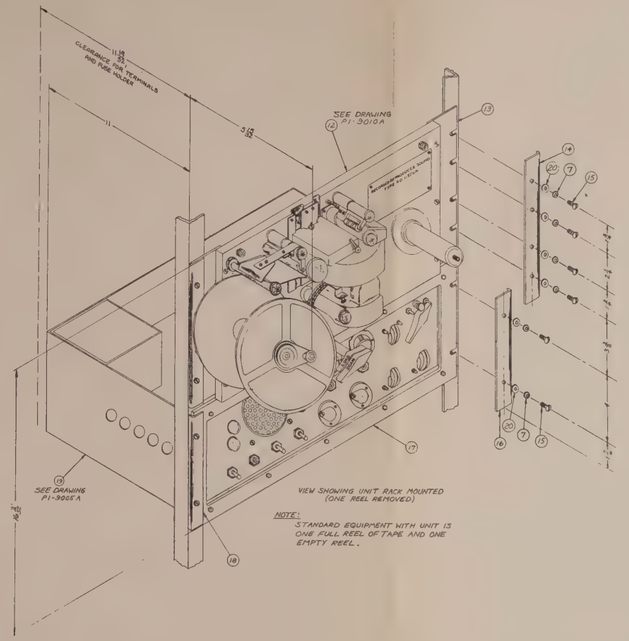


FULL SCALE SECTION SHOWING NORMAL FOOT MOUNTING

FULL SCALE SECTION SHOWING BENCH MOUNTING ARRANGEMENT



REAR PANEL



VIEW SHOWING UNIT RACK MOUNTED (ONE REEL REMOVED)

NOTE:
STANDARD EQUIPMENT WITH UNIT IS ONE FULL REEL OF TAPE AND ONE EMPTY REEL.

LIST OF MATERIAL

PC NO	NAME	NO REQ	MATERIAL	MAT'L SPEC	FINISH	QUANTITIES FOR ONE — CONTRACTOR DWG NO E SERVICE PART NO	QUANTITIES FOR ONE — BU SHIPS DWG NO	QUANTITIES FOR ONE — STD NAVY STOCK NO	REMARKS
1	CABINET ASSEMBLY	1			ENAMEL	D-3009A			
2	DRAW PULL CATCH	4	STEEL		ZINC PL	A-9363			REF. 1
3	COVER ASSEMBLY	1			ENAMEL	D-3006A			
4	HANDLE, CABINET	2	STEEL		ENAMEL	A-3362			REF. 2
5	SCREW, 10-32 x 3/8 FLAT HEAD MCH	6	STEEL		ZINC PL	S-220			
6	NUT, #10-32 HEX	6	STEEL		ZINC PL	N-149			
7	WASHER, #10 SPLIT LOCK	23	BRONZE		NONE	W-301			
8	MOUNTING FOOT, RUBBER	4	SYNTHETIC RUBBER			A-9336			REF. 3
9	SCREW, 1/4-20 x 5/8 ROUND HD MCH	4	STEEL		ZINC PL	S-219			
10	WASHER, 1/4 FLAT (SPECIAL)	4	STEEL		ZINC PL	W-311			
11	POWER CORD - 6 FEET	1				A-3218 A			
12	MECHANICAL ASSEMBLY	1				P1-3010 A			SEE ATTACHED DWG LIST
13	PLATE	2	24S ALUM.		ENAMEL	A-9239			
14	TRIM STRIP, UPPER LEFT & RIGHT	2	24S ALUM.		ENAMEL	A-9297			
15	SCREW #10-32 x 1/4 ROUND HD. MCH	18	STEEL		ZINC PL	S-210			
16	TRIM STRIP, LOWER RIGHT	1	24S ALUM.		ENAMEL	A-9239			
17	RACK PANEL	1	24S ALUM.		ENAMEL	C-9157			
18	TRIM STRIP, LOWER LEFT	1	24S ALUM.		ENAMEL	A-9298			
19	AMPLIFIER ASSEMBLY	1				P1-3005 A			SEE DRAWING NO. SEE REMARKS
20	WASHER, #10 FLAT	18	STEEL		ZINC PL	W-151			
21	SCREW, 6-32 x 3/8 ROUND HD MACH	3	STEEL		ZINC PL	S-198			
22	WASHER, #6 EXT. STAR LOCK	3	BRONZE		NONE	W-309			

REVISIONS

REV	DESCRIPTION	DATE	APPD

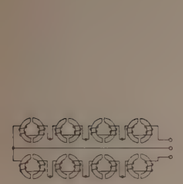
LIST OF MANUFACTURERS

NO	NAME	ADDRESS	DESIG
1	CORBIN CABINET LOCK CO.	NEW BRITAIN, CONN.	MR 12735
2	THE STANLEY WORKS	NEW BRITAIN, CONN.	MR 1805
3	THE CANFIELD RUBBER CO.	BRIDGEPORT, CONN.	MR 613

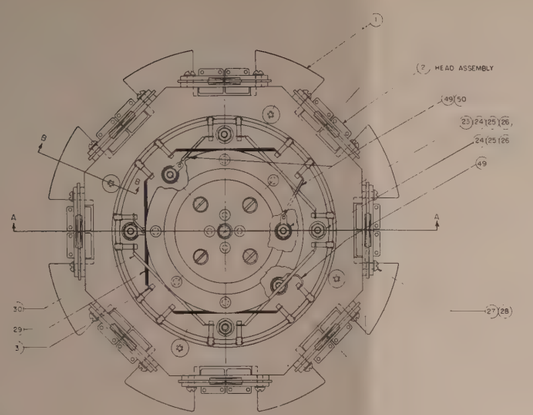
THIS DRAWING IS PART OF A SET CONSISTING OF

NO	NAME	MFG. DWG. NO	BU SHIPS DWG NO
1	FINAL ASSEMBLY	3-10A	56502-3158802
2	TURNTABLE ASSEMBLY	3-31A	56502-3158803
3	MECHANICAL ASSEMBLY	P1-3010A	56502-3158804
4	MECH ASSEM LIST OF MATERIAL	P2-3010A	56502-3158805
5	AMPLIFIER ASSEMBLY	P1-3005A	56502-3163385
6	AMPLIFIER ASSEM LIST OF MAT'L	P2-3005A	56502-3163386
7	SCHEMATIC	C-9000A	56502-3158806
8	WIRING DIAGRAM	C-3005A	56502-3163387
9	DEMAGNETIZER	3250M	56502-3163388

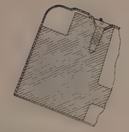
DRAWN	MASTER DRAWING	THE SOUNDSCRIBER CORP NEW HAVEN, CONN.	
TRACED	FINAL ASSEMBLY SOUND RECORDER-REPRODUCER TYPE RD 115/UN	3-10A	
APP'D		NAVY DEPT BU SHIPS NO.	REV
APP'D	DWG	56502-3158802	



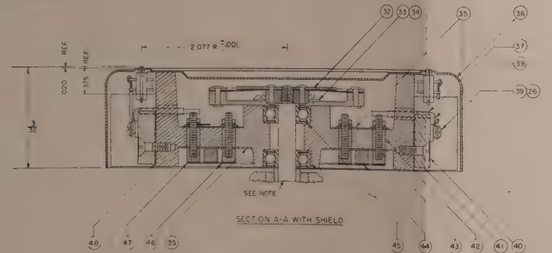
SCHEMATIC DIAGRAM



PLAN VIEW OF TURNTABLE WITHOUT SHIELD

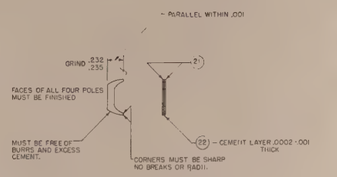


SECTION B-B WITH SHIELD

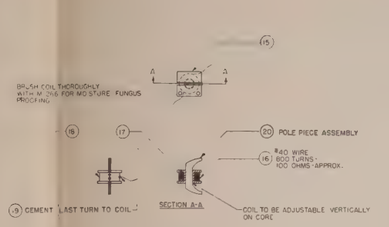


SECTION A-A WITH SHIELD

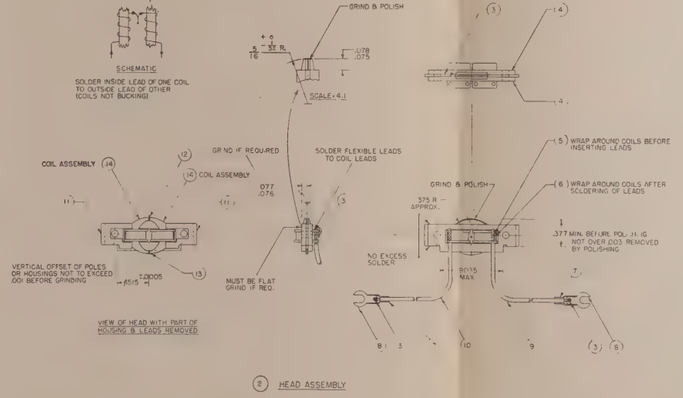
NOTE - .2485 DIA. TURNTABLE SPINDLE - PART OF MECHANICAL ASSEMBLY NO. 9010A 10-32 THREAD, L.H. AT TOP


- PARALLEL WITHIN .001
GRIND .332 .335
FACES OF ALL FOUR POLES MUST BE FINISHED
MUST BE FREE OF BURRS AND EXCESS CEMENT.
21
22 - CEMENT LAYER .0002 - .001 THICK
CORNERS MUST BE SHARP NO BREAKS OR RADII.

20 POLE-PIECE ASSEMBLY



14 COIL ASSEMBLY


SCHEMATIC
SOLDER INSIDE LEAD OF ONE COIL TO OUTSIDE LEAD OF OTHER (COILS NOT BUCKING)
GRIND & POLISH
.078 .075
SCALE 4:1
GRIND IF REQUIRED
SOLDER FLEXIBLE LEADS TO COIL LEADS
COIL ASSEMBLY 14
14 COIL ASSEMBLY
.077 .076
VERTICAL OFFSET OF POLES OR HOUSINGS NOT TO EXCEED .001 BEFORE GRINDING
.6515 +.0005 -.0
MUST BE FLAT GRIND IF REQ.
VIEW OF HEAD WITH PART OF HOUSING & LEADS REMOVED
3
4
5 WRAP AROUND COILS BEFORE INSERTING LEADS
6 WRAP AROUND COILS AFTER SOLDERING OF LEADS
GRIND & POLISH
.375 R - APPROX.
.377 MIN. BEFORE POLISH IS NOT OVER .003 REMOVED BY POLISHING
NO EXCESS SOLDER
.6515 MAX
7
8
10
9
3
5

2 HEAD ASSEMBLY

LIST OF MATERIAL — QUANTITIES FOR G/E

PC NO	NAME	QTY PER	MATERIAL	MATL SPEC	FINISH	CONTRACTOR DWG FA / B SER-VICE PART NO.	BU SHIPS DWG NO	UNIT OF ISSUE	STD NAVY STOCK NO	REMARKS
	TURNTABLE	1	ZINC ALLOY		NONE	B-9021				
3	SOLDER	A/R	60% TIN	QQ-S-571		9-49				
4	HOUSING, HEAD	1	ALUMINUM		WAE	A-9195				
5	POLE-PIECE	8	VARI-PERM			A-5497				
6	INSULATOR-4 LONG (APPROX)	8	FIBRE			M-197				MFR-1
7	SLEEVING #18 - 5/16 LONG	16	VINYL PLASTIC	JAN-I-631		H-301				MFR-2
8	LUG, SOLDERING	6	BRASS		HOT TINNED	A-9279				
9	LEAD - 1 PR LONG-GREEN INS.	8	24 STRAND	JAN-C-76		K-314				MFR-3
10	LEAD-1 PR LONG-BLACK INS.	8	24 STRAND	JAN-C-76		K-313				MFR-3
11	SPACER, HEAD HOUSING	16	.025 BRASS		NONE	A-9196				
12	SHIM, FRONT	8	.005 BRASS		NONE	A-9116				
13	SHIM, BACK	8	.005 BRASS		NONE	A-9117				
15	BOBBIN, COIL	16	NYLON		NONE	A-9181				
16	#40 WIRE	AR/M	COPPER	JAN-W-583	FORMEX	K-34				MFR-4
17	INSULATION	16	VARN. SLK			A-5497				
18	VARNISH, TROPICALIZING	X	BAKE RESIN			M-266				MFR-5
19	CEMENT, AMBROID	X	LIQ ADHESIVE		WATERPROOF	M-204				MFR-6
21	POLE-PIECE	32	254 Mu METAL		NONE	A-9112				
22	CEMENT, ARALDITE	X	LIQ ADHESIVE			M-245				MFR-7
23	LUG, SOLDERING	4	BRASS		HOT TINNED	J-122				MFR-8
24	WASHER #3 FLAT	12	STEEL		ZINC PL.	W-150				
25	NUT #3-48 HEX.	12	STEEL		ZINC PL.	N-145				
26	WASHER #3 LOCK	28	BRONZE	43-W-3	NONE	W-305				
27	SCREW #2-56 X 3/8 RD.HD. MACH.	16	STEEL		ZINC FLASH	S-202				
28	WASHER, #2 SPLIT LOCK	16	BRONZE	43-W-3	NONE	A-304				
29	LEAD WIRE-BLACK INS.	9"	24 STRAND	JAN-C-76		K-313				MFR-3
30	LEAD WIRE-GREEN INS.	9"	24 STRAND	JAN-C-76		K-314				MFR-3
31	SCREW #4-40 X 1/4 FLAT HD. MACH.	4	STEEL		ZINC FLASH	S-205				
32	ASSEMBLY, COUPLING	1				A-9141A				
33	SCREW #4-40 X 1/4 RD. HD. MACH.	4	STEEL		ZINC FLASH	S-203				
34	WASHER #4 SPLIT LOCK	4	BRONZE	43-W-3	NONE	W-306				
35	DISC, INSULATOR	2	GR. PHENOLIC	LTS-M-3	FUNGUS RES	A-9023				
36	SHIELD	1	.015 STL.		SAT. CHROM.	B-9022				
37	SLEEVING #14 - 5/8 LONG	16	VINYL PLASTIC	JAN-I-631		H-301				MFR-2
38	TERMINAL	16	#4 COPPER		TINNED	A-9270				
39	SCREW #3-48 X 1/4 BIND HD MACH	16	STEEL		ZINC FLASH	S-204				
40	SCREW #4-40 X 7/16 FLAT HD MACH	8	STEEL		ZINC FLASH	S-206				
41	STRIP ASSEMBLY, TERMINAL	8				A-9272A				
42	BUSHING, INSULATOR	12	PHENOLIC	LTS-M-3	FUNGUS RES	A-9197				
43	STUD #3-48 X 5/16	12	C.D. STEEL		ZINC FLASH	A-9278				
44	RING, INTERMEDIATE SLIP	1	BRASS-SILVER		NONE	A-9021				
45	BEARING, BALL	2	STEEL		NONE	A-9267				MFR-9
46	RING, INNER SLIP	1	BRASS-SILVER		NONE	A-9024				
47	RING, OUTER SLIP	1	BRASS-SILVER		NONE	A-9026				
48	INSULATOR	8	.015 FIBRE		FUNGUS RES	A-9393				
2	HEAD ASSEMBLY	8				B-9192A				
14	COIL ASSEMBLY	16				A-9115A				
20	POLE PIECE ASSEMBLY	6				A-9144				
49	WIRE, N-22 BUS	3"	COPPER			K-123				
50	TUBING, [illegible]	2"	VINYL PLASTIC	JAN-I-631		H-300				

NOTE ITEM 2 HEAD ASSEMBLY CONSISTS OF ITEMS 4 THRU 22 IN 1/8 THE QUANTITY INDICATED

REVISIONS			
SYM	DESCRIPTION	BY	DATE

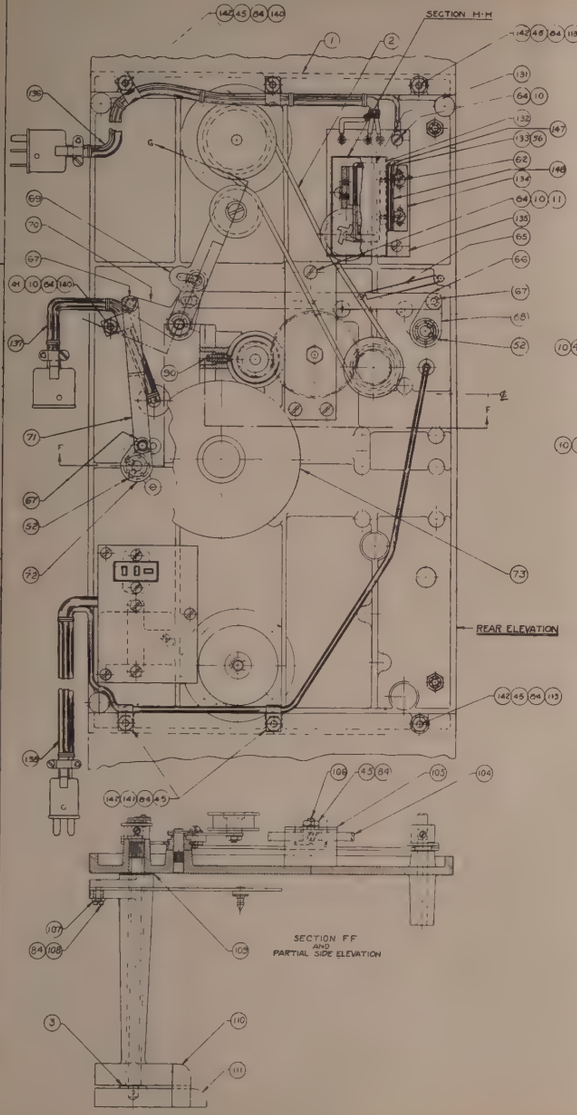
LIST OF MANUFACTURERS

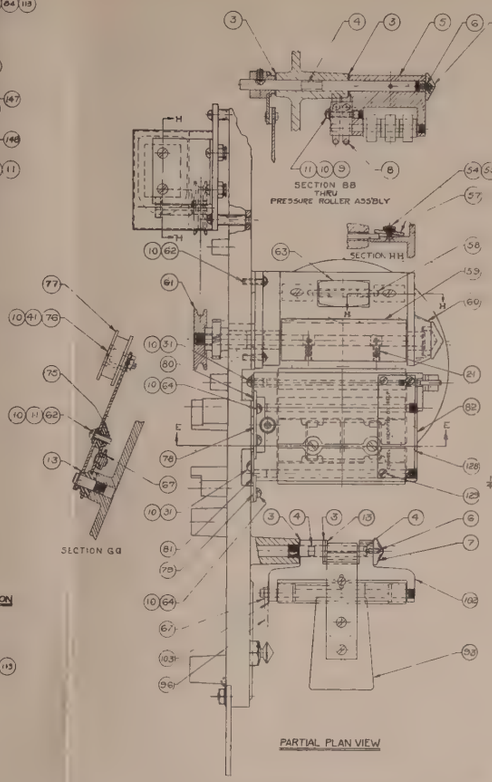
NO	NAME	ADDRESS	DESIG
1	MINNESOTA MIN & MFG CO	ST PAUL, MINN.	NO C
2	NATIONAL VARNISHED PROD CORP	WOODBRIDGE, N.J.	NATVAR 400
3	WILLIAM BRAND & CO	WILLIMANTIC, CONN.	
4	GENERAL ELECTRIC CO	BRIDGEPORT, CONN.	FORMEX
5	BROOKLYN VARNISH MFG CO INC	50 JAY STREET BROOKLYN 1, N.Y.	TUFCOTE
6	AMBROID CO	WEYMOUTH, MASS	AMBROID
7	CIBA CO INC	627 GREENWICH ST NEW YORK, N.Y.	ARALDITE
8	ZIERICK MFG CORP	NEW ROCHELLE, N.Y.	#34
9	NICE BALL BEARING CO	30TH & HUNTING PARK AVE PHILADELPHIA, PA.	#1602-105

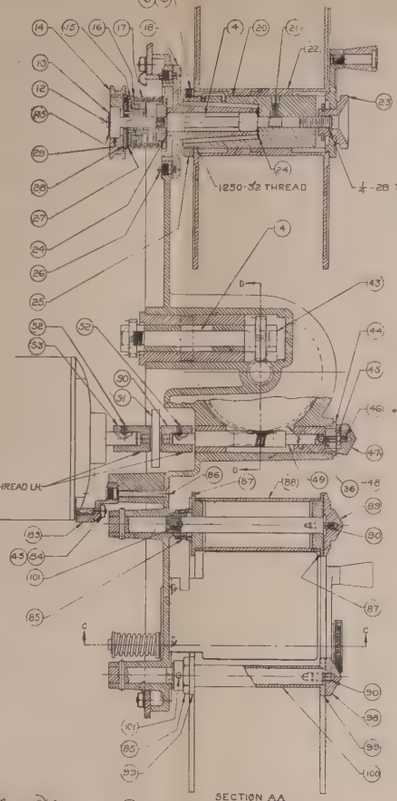
THIS DRAWING IS PART OF A SET CONSISTING OF

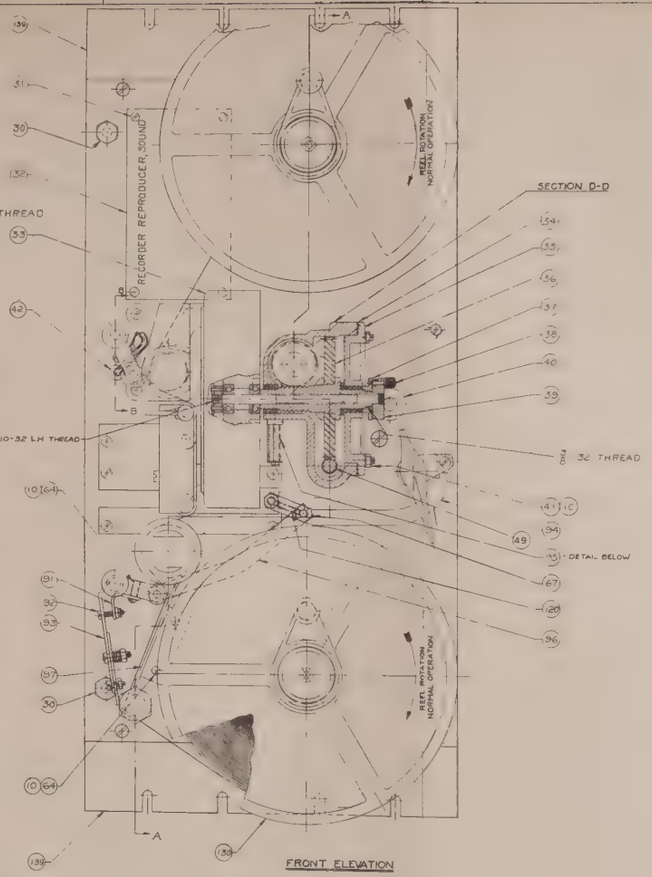
NO	TITLE	MFG. DWG NO	BU SHIPS DWG NO
1	FINAL ASSEMBLY	9010A	S6502-3158802
2	TURNTABLE ASSEMBLY	9191A	S6502-3158803
3	MECHANICAL ASSEMBLY	P1-9010A	S6502-3158804
4	MECHANICAL ASSEMBLY LIST OF MATERIAL	P2-9010A	S6502-3158805
5	AMPLIFIER ASSEMBLY	P1-9005A	S6502-3163385
6	AMPLIFIER ASSEMBLY LIST OF MATERIAL	P2-9005A	S6502-3163386
7	SCHEMATIC	W-9000A	S6502-3158806
8	WIRING DIAGRAM	WP-9005A	S6502-3163387
9	DEMAGNETIZER	9250A	S6502-3163388

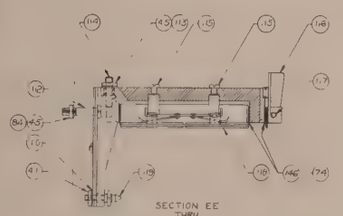
DR	G.I.W	MASTER DRAWING	THE SOUNDSCRIBER CORP. NEW HAVEN, CONN.
DATE	2-15-52	TURNTABLE ASSEMBLY	9191A
CH	[illegible]	SOUND RECORDER-REPRODUCER TYPE RD 115/UN	NAVY DEPT. BUSHIPS NO. REV
DATE		CONTRACT NOas 54469	S6502 IH 3158803
APP	[illegible] 2/15/52		

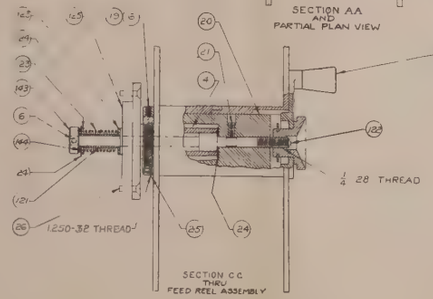


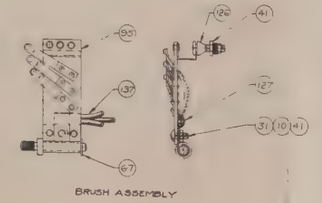












REVISIONS

ZONE	REV	DESCRIPTION	MFG DATE	MFG APPRVD	SS DATE	SS APPRVD

GEAR DATA

ITEM	NAME	SS PART NO	FACE	P.D	T	D.P.	TYPE
36A	GEAR	3170	1/4	2.8266	90	32	HELICAL LH
36B	GEAR, WORM	3172	—	.3625	5	32	HELICAL RH
43A	GEAR, FRONT	9030	1/4	1.0408	32	32	HELICAL RH
43B	GEAR, REAR	9031	3/16	750	24	32	SPUR
43	GEAR, IDLER	9077	-	.3125	1	32	HELICAL LH
61	GEAR, WORM	3078	3/16	.7012	25	32	SPUR
104	GEAR, IDLER	9039	3/16	2.0937	67	32	SPUR

BEARING DATA

ITEM	NAME	SS PART NO	I.D	O.D	LENGTH	TYPE
18	BEARING, NEEDLE	9205	.250	.4328	.437	ROLLER
29	BEARING, BALL	9263	.250	.750	1/4	BALL
36A	BEARING, LOWER	9272	.9385	616	.500	POROUS BRONZE
36B	BEARING, UPPER	9285	.6385	625	.343	POROUS BRONZE
49A	BEARING, FRONT	9271	.251	616	.750	POROUS BRONZE
49B	BEARING, REAR	9261	.371	616	.750	POROUS BRONZE
60	BEARING, NEEDLE	9205	.250	.4328	.437	ROLLER
125	BEARING, NEEDLE	9205	.250	.4328	.437	ROLLER

THIS DRAWING IS PART OF A SET CONSISTING OF - - - -

NO	TITLE	MFG DWG. NO.	BUSHIPS DWG NO
1	FINAL ASSEMBLY	9000A	S6502-3158802
2	TURNTABLE ASSEMBLY	9191A	S6502-3158803
3	MECHANICAL ASSEMBLY	P1-9010A	S6502-3158804
4	MECHANICAL ASSEMBLY LIST OF MATERIAL	P2-9010A	S6502-3158805
5	AMPLIFIER ASSEMBLY	P1-9005A	S6502-3163385
6	AMPLIFIER ASSEMBLY LIST OF MATERIAL	P2-9005A	S6502-3163386
7	SCHEMATIC	W-9000A	S6502-3158806
8	WIRING DIAGRAM	WP-9005A	S6502-3163387

DR. FCC — MASTER DRAWING

DATE 2-29-52
CH [illegible]
APP'D —
APR'C — DATE —

MECHANICAL ASSEMBLY
SOUND RECORDER-REPRODUCER
TYPE RD 115/UN
CONTRACT NObs 34469

SOUNDSCRIBER CORP
NEW HAVEN, CONN.
P1-9010A

NAVY DEPT. BUSHIPS DWG NO. — REV.
S6502M3158804

LIST OF MATERIAL — QUANTITIES FOR ONE

MATERIAL	MATL SPEC	FINISH	CONTRACTOR DWG NO & SERVICE PART NO	BUSHIP DWG NO	UNIT WT LB	STD NAVY STOCK NO	REMARKS
.062 STEEL		ZINC	9037				
STEEL		NICKEL	9038				
STEEL		ZINC	9348				
STEEL		NICKEL	9169				
.005 BRONZE		NICKEL	9265				
ALUM CSTG		ENAMEL	9165				
ALUM CSTG		ENAMEL	9167A				STEEL SHAFT
STEEL		NICKEL	9173				
STEEL		ZINC	W-144				
STEEL		ZINC	S-200				
STEEL		ZINC	S-201				
ALUM CSTG		ENAMEL	9361A				STEEL INSERT
STEEL		ZINC	S-207				
STEEL		NICKEL	9174A				STAINLESS SHOE RUBBER INSERT
STEEL		NICKEL	9162				
STEEL		ZINC	9236				.034 MUSIC WIRE
STEEL		NONE	9074				STAINLESS
STEEL		NONE	9075				STAINLESS
STEEL		ZINC	W-148				
STEEL		ZINC	9099				MUSIC WIRE
ALUM CSTG		ENAMEL	9013A				
STEEL		NICKEL	9185				
STEEL		ZINC	9-90				MFR-9
NICKEL COPPER	46-M-7		D-303				MFR.-5
STEEL		ZINC	S-204				
			9255A				
			9390A				
ALUM.		ANODIZE	9426				
STEEL		ZINC	S-239				
ALUM		ANODIZE	9424				
PHENOLIC		FUNGUS RES.	9423A				
"			9473A				
			9474A				
			9478A				
ALUM.		ENAMEL	9239				
STEEL		ZINC	Z-96				
STEEL		ZINC	Z 197				
STEEL		ZINC	S-224				
STEEL		ZINC	Z-209				
.010 NYLON			7576				
.010 BRONZE		NICKEL	W-161				
.003 BRONZE		NICKEL	9448				
RUBBER			9482				
ALUM.		ANODIZE	9481				

REVISIONS

REV	DESCRIPTION	MFR DATE	MFR APPD	USN DATE	USN APPD

LIST OF MANUFACTURERS

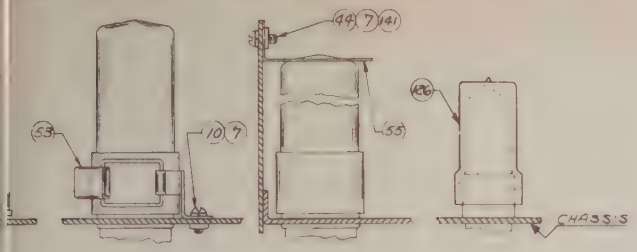
NO	NAME	ADDRESS	DESIG
1	L.H. GILMER CO.	TACONY	
		PHILA. 35, PA.	8172
2	WALDES KOHINOOR, INC.	LONG ISLAND CITY, N.Y.	(A) 3733-25 (B) 3733-76
3	WINCHESTER RPTG. ARMS CO.	NEW HAVEN, CONN.	
4	THE SHATZ MFG. CO.	W. POUGHKEEPSIE, N.Y.	CS-1733
5	EASTERN ETCHING & MFG. CO.	CHICOPEE, MASS.	
6	CANFIELD RUBBER CO.	BRIDGEPORT, CONN.	(A) 6384 (B) 3074
7	HARTFORD STEEL BALL CO.	HARTFORD, CONN.	GRADE 3
8	GENERAL ELECTRIC CO.	FT. WAYNE, IND.	DWG. #1 B 9287 MOD. 28H1201
9	ZIERICK MFG. CO.	NEW ROCHELLE, N.Y.	CAT. "78
10	CINCH MFG. CORP.	1026 SO. HOMAN AVE.	
	"	CHICAGO, ILL.	(B) P303CCT

THIS DRAWING IS PART OF A SET CONSISTING OF

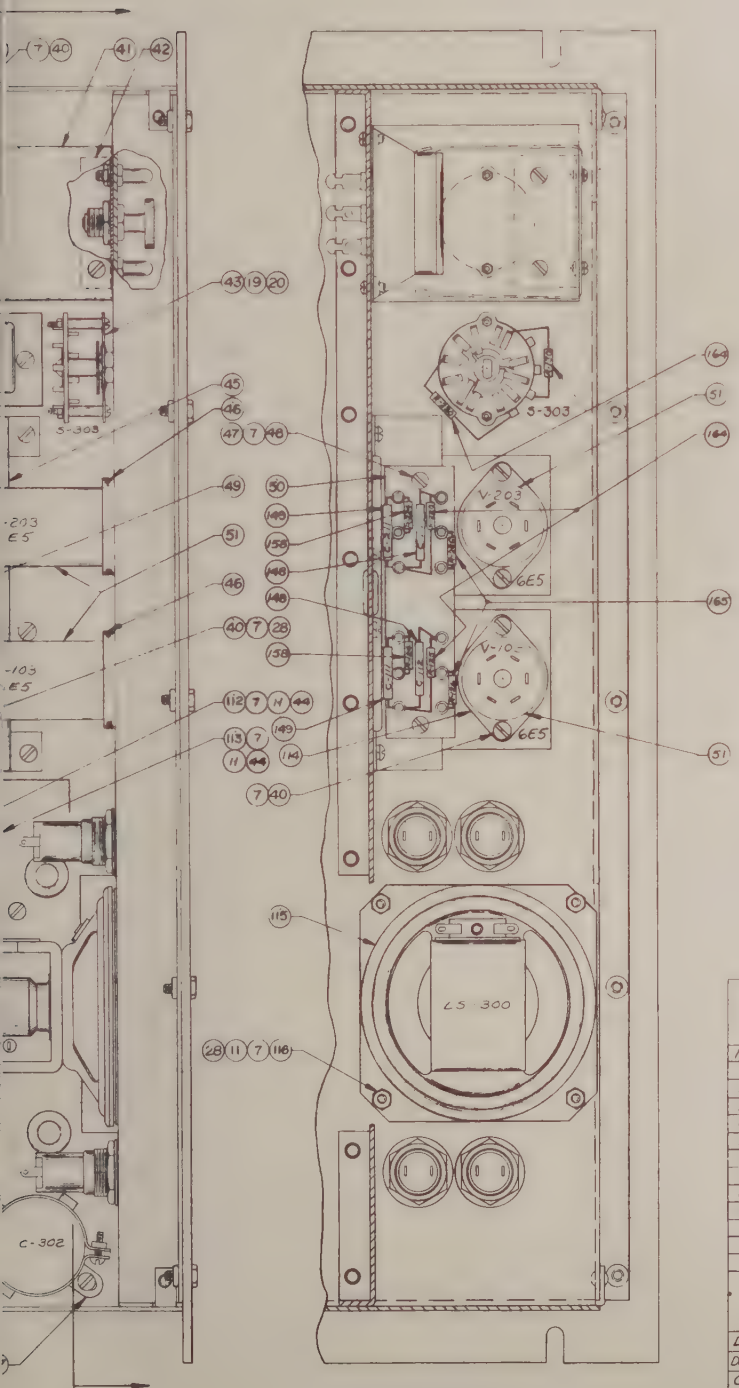
NO	TITLE	DRAWING NO CONTRACTOR MFG	DRAWING NO BUSHIPS
1	FINAL ASSEMBLY	9000A	S6502-3158802
2	TURNTABLE ASSEMBLY	9191A	S6502-3158803
3	MECHANICAL ASSEMBLY	P1-9010A	S6502-3158804
4	MECH. ASSEM. LIST OF MATL	P2-9010A	S6502-3158805
5	AMPLIFIER ASSEMBLY	P1-9005A	S6502-3163385
6	AMPLIFIER ASSEM. LIST OF MATL	P2-9005A	S6502-3163386
7	SCHEMATIC	W-9000A	S6502-3158806
8	WIRING DIAGRAM	WP-9005A	S6502-3163387
9	DEMAGNETIZER	9250A	S6502-3163388

DR. F.C.L.	MASTER DRAWING	THE SOUNDSCRIBER CORP NEW HAVEN, CONN. P2-9010A	
DATE 2-29-52	MECHANICAL ASSEMBLY LIST OF MATERIAL		
CH J.M.C.L.	SOUND RECORDER-REPRODUCER TYPE RD 115/UN CONTRACT NObs 54469	NAVY DEPT BUSHIPS DWG NO	REV
APP. L.T.		S6502 F 3158805	
APP'D DATE (USN) (COL) 7/7/52	SCALE — WT —	CONT ON SHT	SHT NO

REVISIONS					
REV	DESCRIPTION	MFR DATE	MFR APP'D	USN DATE	USN APP'D



TUBE CLAMP DETAILS



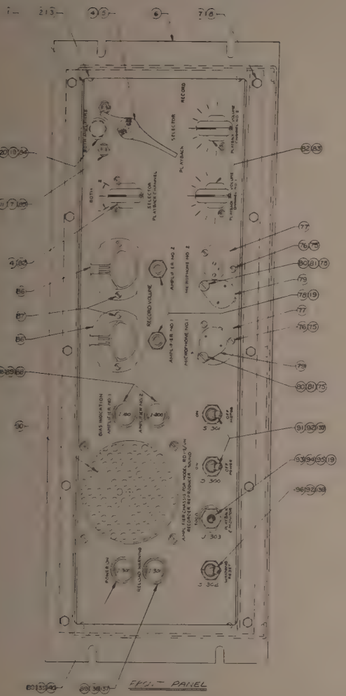
PARTIAL SECTION AT "F-F"
LOOKING IN DIRECTION OF ARROWS

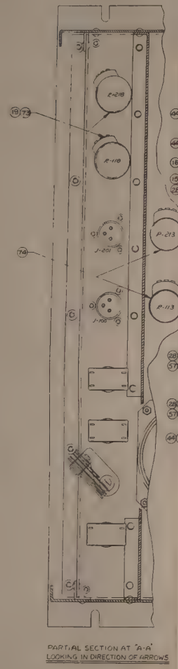
THIS DRAWING IS PART OF A SET
CONSISTING OF

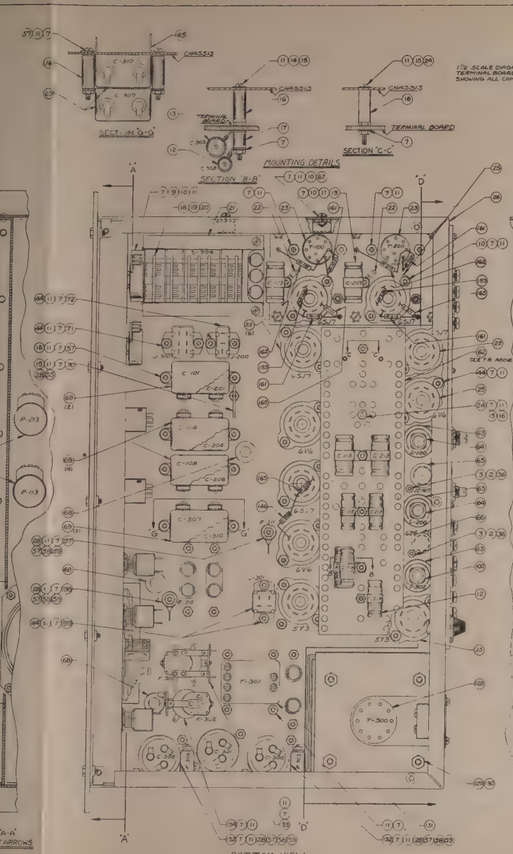
NO.	TITLE	MFR. DWG. NO.	BU. SHIPS DWG. NO.
1	FINAL ASSEMBLY	9000A	S6502-3158802
2	TURNTABLE ASSEMBLY	9191A	S6502-3158803
3	MECHANICAL ASSEMBLY	P1-9010A	S6502-3158804
4	MECH. ASSEM. LIST OF MATERIAL	P2-9010A	S6502-3158805
5	AMPLIFIER ASSEMBLY	P1-9005A	S6502-3163385
6	AMPLIFIER ASSEM. LIST OF MAT'L.	P2-9005A	S6502-3163386
7	SCHEMATIC	W-9000A	S6502-3158806
8	WIRING DIAGRAM	WP-9005A	S6502-3163387
9	DEMAGNETIZER	9250A	S6502-3163388

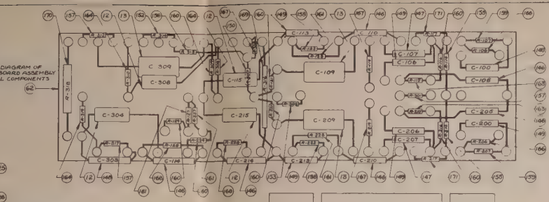
DR.	C.G. Tarbridge	MASTER DRAWING	THE SOUNDSCRIBER CORP. NEW HAVEN, CONN. P1-9005A
DATE	3-25-52	AMPLIFIER ASSEMBLY	NAVY DEPT. BUSHIPS NO. S6502 H 3163385 REV
CH.	W.L. 6-24	SOUND RECORDER-REPRODUCER TYPE RD115/UN	
APP.	L.T.		
APP'D.	DATE		
SCALE 1"=1"	WT. ACTUAL 27LBS	CONT. ON SHT.	SHT. NO.

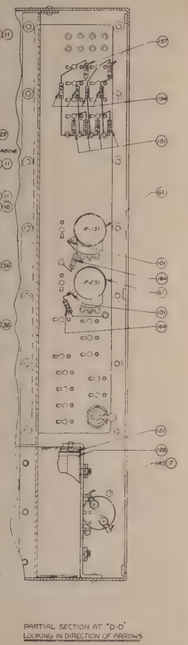
| LIST OF MATERIAL | | | | | QUANTITIES FOR ONE | | | | |

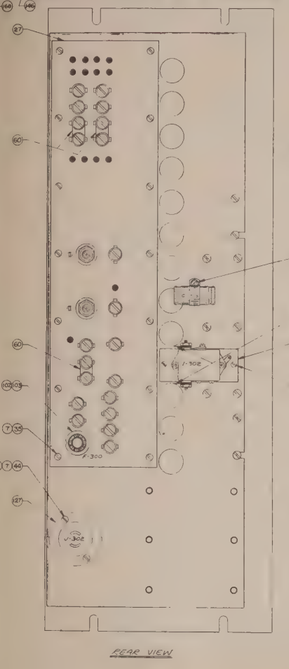


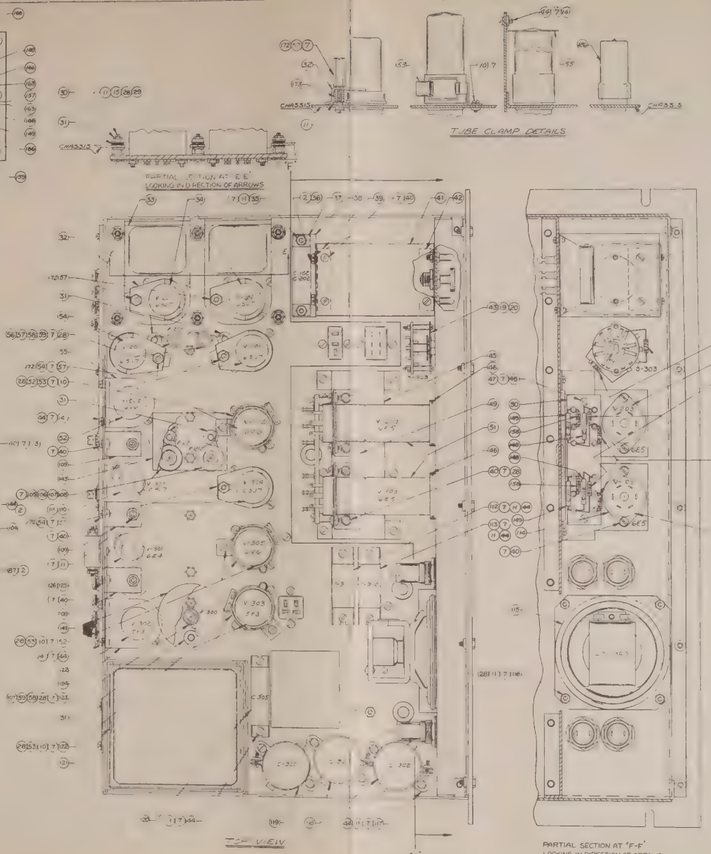


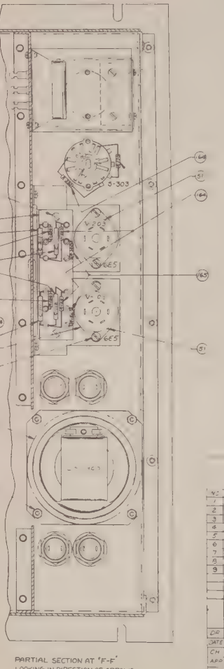












REVISIONS

REV	DESCRIPTION	APP	DATE

THIS DRAWING IS PART OF A SET CONSISTING OF

NO	TITLE	MFR DWG NO	BU SHIPS DWG NO
1	FINAL ASSEMBLY	3000A	56502-3158802
2	TURNTABLE ASSEMBLY	3131A	56502-3158803
3	MECHANICAL ASSEMBLY	PI-3010A	56502-3158804
4	MECH ASSEM LIST OF MATERIAL	PZ-3010A	56502-3158805
5	AMPLIFIER ASSEMBLY	P 3005A	56517-3163385
6	AMPLIFIER ASSEM LIST OF MAT'L	PZ 3005A	56502-3163386
7	SCHEMATIC	SC-3004A	56502-3158806
8	WIRING DIAGRAM	WP-3005A	56502-3163387
9	DEMAGNETIZER	9250A	56502-3163388

DR	F.E. Lindsay	MASTER DRAWING	THE SOUNDSCRIBER CORP. NEW HAVEN, CONN.
DATE	5-14-52	AMPLIFIER ASSEMBLY	PI-3005A
CH	J.S.L. & P.M.	SOUND RECORDER-REPRODUCER TYPE RD11B/UN	
APP			
DATE	5-22-52		
			SHIPYARD BUSHING NO.
			56502-H1-E63385
SCALE	1"=1"	WT. ACTUAL 27 LBS	CONT ON SHT.

PC NO	NAME	NO REQ	MATERIAL	MATL SPEC	FINISH	CONTRACTOR DWG NO. & SOURCE PART NO	BUSHIP DWG NO.	UNIT WT LB	STD NAVY STOCK NO	REMARKS
1	PLATE, FRONT	1	ALUM		ENAMEL	9307				
2	WASHER, #4 SPLIT LOCK	14	BRONZE		NONE	W-306				
3	SCREW, #4-40 X 1/4 RD. HD. MACH.	8	STEEL		ZINC	S-205				
4	SCREW #8-32 X 3/16 SOCKET SET (CUP PT)	3	STEEL		ZINC	S-217				
5	HANDLE ASSEMBLY	1	ALUM CSTG.		ENAMEL	9286A				
6	PANEL, RACK	1	ALUM		ENAMEL	9157				
7	WASHER, #6 SPLIT	148	BRONZE		NONE	W-302				
8	SCREW, #6-32 X 3/8 HEX. HD. MACH.	10	STEEL		ZINC	S-228				
9	CHANNEL, FRONT	1	ALUM		ANODIZE	9342				
10	SCREW, #6-32 X 5/8 RD. HD. MACH.	12	STEEL		ZINC	S-185				
11	NUT, #6-32 HEX.	102	STEEL		ZINC	N-143				
12	CAPACITOR, .01 mfd. 600 V	4		JAN-C-25		C-316				
13	CAPACITOR, .05 mfd. 600 V	6		JAN-C-25		C-308				
14	SCREW, #6-32 X 1/4 RD. HD. MACH	1	STEEL		ZINC	S-227				
15	WASHER, #6 EXTERNAL LOCK	13	BRONZE		NONE	W-309				
16	SPACER, 1"	14	STEEL		ZINC	Z-315				
17	SPACER, 1/2"	1	STEEL		ZINC	Z-316				
18	SWITCH, SELECTOR	1				G-301				MFR.-1 (a)
19	WASHER, 3/8 INTERNAL LOCK	8	BRONZE		ZINC	W-152				
20	NUT, 3/8-32 HEX.	3	BRASS		NICKEL	N-128				
21	CHANNEL, SIDE	2	ALUM		ANODIZE	9341				
22	LUG, SOLDERING	2	BRONZE		HOT DIPPED	J-136				
23	TRANSFORMER, INPUT	2		MIL-T-27		L-300				MFR.-2 (a)
24	SCREW, #6-32 X 1/4 RD HD MACH.	5	STEEL		ZINC	S-226				
25	SOCKET, TUBE	10		JAN-S-28A		J-311				
26	CHASSIS, MECHANICAL ASSEMBLY	1	ALUM		ANODIZE	9153A				
27	PANEL ASSEMBLY, REAR	1	PHENOLIC		FUNGUS RES.	9305A				
28	WASHER, #6 FLAT	31	STEEL		ZINC	W-147				
29	SCREW, #6-32 X 1/8 RD. HD. MACH.	6	STEEL		ZINC	S-304				
30	NUT, #6-32 FLEX. LOC	6	STEEL		ZINC	N-158				
31	GROMMET	11	RUBBER			8-775				MFR.-3 (a)
32	CLAMP, METAL TUBE	5	STEEL		ZINC	9395				
33	TERM. BOARD ASSEMBLY	1	PHENOLIC		FUNGUS RES.	9382A				
34	TUBE, ELECTRON 6SJ7 SELECTED	2		JAN-1A		V-316				
35	SCREW, #6-32 X 3/16 RD. HD. MACH	17	STEEL		ZINC	S-305				
36	NUT, #4-40 HEX.	6	STEEL		ZINC	N-148				
37	CAPACITOR, 2X .05 mfd. 600 V	1		JAN-C-25		C-308				
38	BRACKET, SELECTOR SWITCH	1	STEEL		ZINC	9343				
39	BRACKET ASSEMBLY	1	STEEL		ZINC	9373A				
40	SCREW, #6-32 X 1/4 RD. HD. MACH.	18	STEEL		ZINC	S-198				
41	COVER, SELECTOR SWITCH	1	STEEL		ZINC	9366				
42	BRACKET ASSEMBLY	1	STEEL		ZINC	9372A				
43	SWITCH, SELECTOR	1				G-308				MFR.-1 (b)
44	SCREW, #6-32 X 3/16 RD. HD. MACH.	40	STEEL		ZINC	S-212				
45	TUBE PLATFORM ASSY, INDICATOR	1	STEEL		ZINC	9365A				
46	GROMMET, TUBE	2	RUBBER			9416				
47	SCREW, #6-32 X 3/16 RD HD MACH	2	STEEL		ZINC	S-196				
48	SPACER, 3/8"	2	STEEL		ZINC	9394				
49	TUBE BRACKET ASSEMBLY	2	STEEL		ZINC	9368A				
50	TERMINAL BOARD ASSY, INDICATOR	1	PHENOLIC		FUNGUS RES.	9368A				
51	TUBE, ELECTRON 6E5	2		JAN-1A		V-309				
52	TUBE, ELECTRON 6V6GT	3		JAN-1A		V-302				
53	CLAMP, TUBE	3	ST. STEEL		NONE	9428				
54	TUBE, ELECTRON 6SJ7	3		JAN-1A		V-301				
55	CLAMP, SHORT SPRING	1	BRONZE		NICKEL	9418				
56	RESISTOR, WIRE WOUND, 5 ohms, 8 WATTS	2		JAN-R-26A		R-332				
57	SCREW, #6-32 X 1 1/2 RD. HD. MACH.	19	STEEL		ZINC	S-302				
58	WASHER, CENTERING	14	STEEL		ZINC	W-158				MFR.-4 (a)
59	WASHER, FLAT	13	FIBRE		FUNGUS RES.	W-307				
60	LINK	3	BRASS		NICKEL	J-300				
61	POTENTIOMETER, 100 K ohms, 1/2 WATT	2	COMPOSITION	JAN-R-94		R-344				MFR.-5 (a)
62	TERMINAL BOARD ASSEMBLY	1	PHENOLIC		FUNGUS RES	9344A				
63	GROMMET, COIL	3	RUBBER			9375				MFR.-3 (b)
64	CHOKE	2				L-307				MFR.-6 (a)
65	SOCKET, TUBE	1		JAN-S-28A		J-318				
66	SOCKET, TUBE	1		JAN-S-28A		J-317				
67	CLAMP, MIC. CABLE	2	STEEL		ZINC	Z-198				
68	GROMMET	3	RUBBER			8-80				MFR.-3 (c)
69	CAPACITOR, 50 mfd. 25 V	8		JAN-C-62		C-307				
70	CHASSIS GROUND BUS	1	COPPER		TINNED	9392				
71	PLUG, 6-PRONG	1				J-315				MFR.-7 (a)
72	SOCKET, 3 PRONG	1				9-1548				MFR.-7 (b)
73	POTENTIOMETER, 500 K ohms, 1/2 WATT	2	COMPOSITION	JAN-R-94		R-342				MFR.-5 (b)
74	POTENTIOMETER, 500 K ohms, 1/2 WATT	2	COMPOSITION	JAN-R-94		R-343				MFR.-5 (c)
75	CEMENT, GLYPTAL	X				9-604				
76	SCREW #4-40 X 3/16 FLAT HD MACH.	4	STEEL		ZINC	S-206				
77	SOCKET, MICROPHONE	2				J-301				
78	NUT, VOLUME CONTROL	2	STEEL		NICKEL	9159				
79	CAP, DUST	2	BRASS		NICKEL	9374				
80	SCREW, SHOULDER	2	STEEL		NICKEL	9381				
81	WASHER SPRING	2	STEEL		ZINC	W-124				
82	KNOB	3	TENITE			9-1448X				MFR.-8
83	SCREW #8-32 X 1/4 SOCKET SET (CUP PT)	2	STEEL		ZINC	S-194				
84	LOCK, PUSH BUTTON	1	STEEL		NICKEL	9256A				
85	PIN, STOP	2	STEEL		NICKEL	9306				
86	ESCUTCHEON, INDICATOR	2	BRASS		ENAMEL	9330				
87	SCREW, #4-40 X 5/16 RD HD. MACH	6	STEEL		ZINC	S-225				
88	CAP, CLEAR	2	GLASS			9280				MFR.-9 (a)
89	SOCKET, PILOT LIGHT	4				J-306				MFR.-9 (b)
90	SCREEN, SPEAKER	1	STEEL		ENAMEL	9156				
91	SWITCH ST22K	2		JAN-S-23		G-300				
92	RING, LOCKING	3	STEEL		ZINC	W-312				
93	JACK JJ-095	1		JAN-J-641		J-302				
94	WASHER, FIBRE SHOULDER-3/8 I.D.	1	FIBRE		FUNGUS RES.	W-319				
95	WASHER, FLAT-3/8 I.D.	1	FIBRE		FUNGUS RES	W-315				
96	SWITCH ST16B	1		JAN-S-23		G-302				
97	RESISTOR, WIRE WOUND, 220 ohms 8 W	1		JAN-R-26A		R-339				
98	RESISTOR, WIRE WOUND, 12 ohms 8 W	1		JAN-R-26A		R-303				
99	SOCKET, 4 PRONG	1				9-1551				MFR.-7 (c)
100	COIL	1				L-306				MFR.-6 (b)
101	LUG, GROUNDING	2	BRASS		TINNED	J-129X				
102	HOLDER, FUSE	1				Z-307				MFR.-10 (a)
103	FUSE, 3 AMP	1				Z-308				MFR.-10 (b)
104	BUZZER ASSEMBLY	1				9399A				

PC NO	NAME	NO REQ	MATERIAL	MATL SPEC	FINISH	CONTRACTOR DWG NO & SOURCE PART NO	BUSHIP DWG NO	UNIT WT LB	STD NAVY STOCK NO	REMARKS
105	WASHER, FIBRE	2	FIBRE		FUNGUS RES.	W-308				
106	WASHER, CENTERING	3	STEEL		ZINC	W-159				MFR.-4 (b)
107	SCREW, 6-32 X 3/16 RD. HD. MACH.	3	STEEL		ZINC	S-306				
108	RESISTOR, WIRE WOUND, 12 K ohms, 30W	2		JAN-R-26A		R-317				
109	BRACKET ASSEMBLY, COIL	3	STEEL		ZINC	9371A				
110	SHIELD, TUBE	1		JAN-S-28A		Z-313				
111	TUBE, ELECTRON 12AU7	1		JAN-1A		V-317				
112	CAPACITOR, .25 mfd. 600 V	1		JAN-C-25		C-312				
113	CAPACITOR, .05 mfd 600 V	1		JAN-C-25		C-302				
114	SOCKET, TUBE	2		MTS-E-4		J-312				
115	SPEAKER	1				T-301				MFR.-11
116	SCREW, #6-32 X 1/8 RD. HD. MACH.	4	STEEL		ZINC	S-185				
117	CLAMP, CAPACITOR	3				Z-314				MFR.-12
118	CAPACITOR, 45X45 mfd. 400 V	2		JAN-C-62		C-314				
119	CAPACITOR, 40X40 mfd. 450 V	1		JAN-C-62		C-306				
120	CAPACITOR, .1 mfd. 600 V	1		JAN-C-25		C-317				
121	SHIELD, TRANSFORMER	1	COPPER		ENAMEL	9340				
122	TUBE, ELECTRON, 5Y3GT	2		JAN-1A		V-304				
123	RESISTOR, C.T.W.W. 2500 ohms, 16.2 W	1		JAN-R-26A		R-313				
124	CLAMP, LONG SPRING	1	BRONZE		NICKEL	9417				
125	TUBE, ELECTRON 6C4	1		JAN-1A		V-303				
126	SHIELD, TUBE	1		JAN-S-28A		Z-312				
127	PLUG, POWER	1				J-309				MFR.-13
128	TRANSFORMER, POWER	1		MIL-T-27		L-302				MFR.-2 (b)
129	WASHER, #10 SPLIT LOCK	4	BRONZE		NONE	W-301				
130	NUT, #10-32 HEX.	4	STEEL		ZINC	N-148				
131	TRANSFORMER, OUTPUT	1		MIL-T-27		L-301				MFR.-14
132	RESISTOR, WIRE WOUND, 500 ohms, 8 W	2		JAN-R-26A		R-308				
133	RELAY, DOUBLE POLE, 6 V A.C.	1				Z-306				MFR.-15 (a)
134	RELAY, S.P.S.T., 40 V. D.C.	1				Z-309				MFR.-15 (b)
135	CAP, GREEN	1	GLASS			9281				MFR.-9 (c)
136	LAMP, 6-8 V, 15 amp.-TYPE #47	1				V-300				MFR.-16 (a)
137	CAP, RED	1	GLASS			9282				MFR.-9 (d)
138	LAMP, G.E.-TYPE NE-51	2				V-313				MFR.-16 (b)
139	WASHER, #6 INTERNAL LOCK	3	BRONZE		ZINC	W-153				
140	LAMP, 12-16 V, 2 AMP TYPE 1815	1				V-319				MFR.-16 (c)
141	NUT, PLATE	2	STEEL		ZINC	9344				
142	INSULATOR, RESIST. TMNL.-SINGLE	1	FIBRE		FUNGUS RES	9452				
143	INSULATOR, RESIST. TMNL.-DOUBLE	1	FIBRE		FUNGUS RES.	9453				
144	TERMINAL	2	BRASS		NONE	J-144				
145	TERMINAL	2	BRASS		TINNED	J-164				
146	CAPACITOR, .0004 T mfd 500 V.	7		JAN-C-5		C-310				
147	CAPACITOR, .002 mfd 500 V.	2		JAN-C-5		C-311				
148	CAPACITOR, .0022 mfd. 500V.	3		JAN-C-5		C-315				
149	CAPACITOR, .0047 mfd 500V	8		JAN-C-5		C-316				
150	RESISTOR, W.W. 62 ohms, 1/2 WATT	1		JAN-R-184		R-304				
151	RESISTOR, COMP, 270 ohms, 1/2 WATT	4		JAN-R-11		R-306				
152	RESISTOR, COMP, 1000 ohms, 1/2 WATT	1		JAN-R-11		R-309				
153	RESISTOR, COMP, 1500 ohms, 1/2 WATT	3		JAN-R-11		R-310				
154	RESISTOR, COMP, 2700 ohms, 1/2 WATT	4		JAN-R-11		R-312				
155	RESISTOR, COMP, 3900 ohms, 1/2 WATT	2		JAN-R-11		R-314				
156	RESISTOR, COMP, 7500 ohms, 1/2 WATT	1		JAN-R-11		R-315				
157	RESISTOR, COMP., 2K ohms, 1/2 WATT	5		JAN-R-11		R-318				
158	RESISTOR, COMP, 6.7K ohms, 1/2 WATT	6		JAN-R-11		R-318				
159	RESISTOR, COMP, 36K ohms, 1/2 WATT	2		JAN-R-11		R 366				
160	RESISTOR, COMP, 100K ohms, 1/2 WATT	8		JAN-R-11		R-320				
161	RESISTOR, COMP, 220K ohms, 1/2 WATT	8		JAN-R-11		R 322				
162	RESISTOR, COMP, 240K ohms, 1/2 WATT	2		JAN-R-11		R 323				
163	RESISTOR, COMP, 300K ohms, 1/2 WATT	2		JAN-R-11		R-324				
164	RESISTOR, COMP, 470K ohms, 1/2 WATT	7		JAN-R-11		R-325				
165	RESISTOR, COMP, 1.2 M ohms, 1/2 WATT	5		JAN-R-11		R-326				
166	RESISTOR, COMP., 1.5 K ohms, 1/2 WATT	2		JAN-R-11		R-336				
167	RESISTOR, COMP, 4.7 M ohms, 1/2 WATT	3		JAN-R-11		R-337				
168	RESISTOR, COMP., 1.5 M ohms, 1/2 WATT	2		JAN-R-11		R-351				
169	RESISTOR, COMP., 1500 ohms, 2 WATTS	1		JAN-R-11		R-352				
170	RESISTOR, COMP., 10K ohms, 2 WATTS	1		JAN-R-11		R-353				
171	RESISTOR, COMP. 62 K ohms, 1/2 WATT	1		JAN-R-11		R-365				
172	NUT, 6-32 - TUBE CLAMP	5	STEEL		ZINC	3541				
173	SPRING, COMP. - TUBE CLAMP	5	STEEL		ZINC	9945				

REV	DESCRIPTION	MFR DATE	MFR APPD	USN DATE	USN APPD

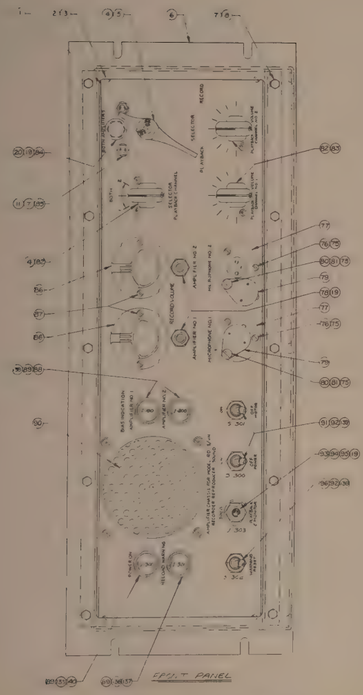
LIST OF MANUFACTURERS

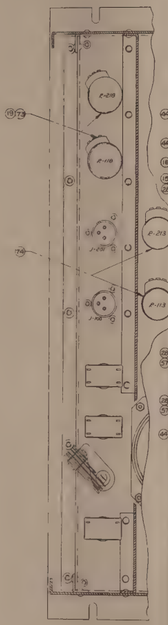
NO	NAME	ADDRESS	DESIG
1	GRIGSBY, ALLISON CO., INC	407, NO SALEM AVE.	(a) 93693-4MW8
		ARLINGTON HEIGHTS, ILL.	(a) 93967-4MW-1
2	TRIAD TRANSFORMER MFG. CO.	2254 SEPULVEDA BLVD.	(a) HS-1
		LOS ANGELES, CALIF.	(b) HS-207
3	THE CANFIELD RUBBER CO	BRIDGEPORT, CONN	(a) 2-1
4	WARD-LEONARD ELEC. CO.	31 SOUTH STREET	(a) E8581.3-1
		MOUNT VERNON, N.Y.	(b) E2581.18-5
5	CHICAGO TELEPHONE SUPPLY CO	ELKHART, INDIANA	
6	CAMBRIDGE THERMIONIC CORP	439 CONCORD AVE	(a) ES411-2
		CAMBRIDGE 38, MASS	(b) ES411-1
7	CINCH MFG. CO	1026 SO. ROMAN AVE.	a) P30848
		CHICAGO 22, ILL.	(b) 30548 (c) 30548
8	CRONAME INC.	370 RAVENSWOOD AVE.	
		CHICAGO 13, ILL.	6120
9	DIAL LIGHT CO. OF AMERICA	900 BROADWAY	(a) 84-1157 (b) 84-1156 (c) 84-1176
		NEW YORK 3, N.Y.	
10	LITTLEFUSE INC.	4754 NO RAVENSWOOD	(a) 340036
		CHICAGO 40, ILL.	(b) 312003
11	OXFORD ELECTRIC CORP.	3911 SO MICHIGAN AVE.	
		CHICAGO, ILL.	3CM-24T
12	CORNELL-DUBILIER ELECTRIC CORP	50 PLAINFIELD, N.J.	176436-2
13	HARVEY HUBBELL INC.	STATE & BOSTWICK AVE	
		BRIDGEPORT, CONN	7466
14	STANDARD TRANSFORMER CORP	3580 ELSTON AVE.	
		CHICAGO 18, ILL.	252A12
15	POTTER & BRUMFIELD MFG. CO.	PRINCETON, INDIANA	(a) 5PA-1 (b) 5PA-21
16	GENERAL ELECTRIC CO.	1285 BOSTON AVE.	(a) 16-21
		BRIDGEPORT 8, CONN.	(c) 18-15

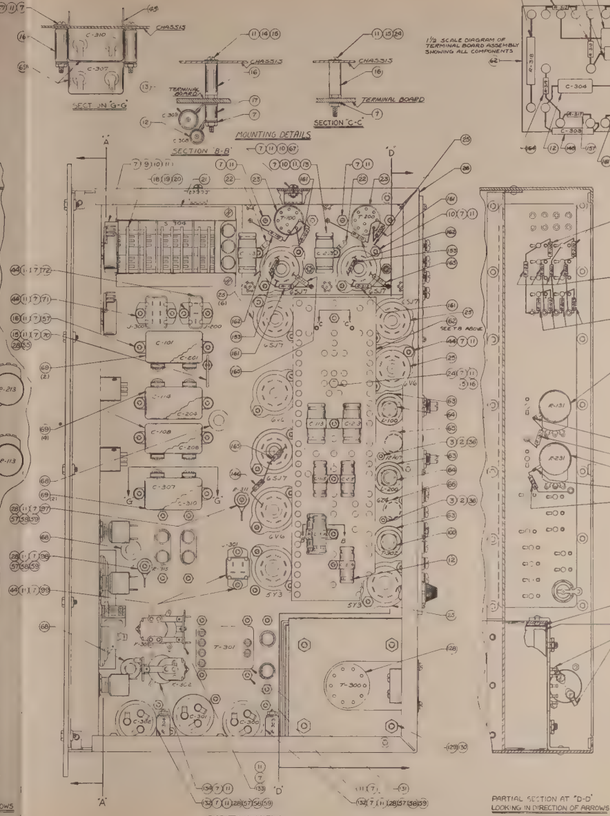
THIS DRAWING IS PART OF A SET CONSISTING OF

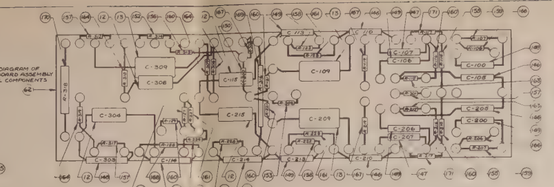
NO	TITLE	DRAWING NO CONTRACTOR TYPE	DRAWING NO BUSHIPS
1	FINAL ASSEMBLY	9000A	56502-3158802
2	TURNTABLE ASSEMBLY	9191A	56502-3158803
3	MECHANICAL ASSEMBLY	PI-9010A	56502-3158804
4	MECH. ASSEM. LIST OF MATERIAL	P2-9010A	56502-3158805
5	AMPLIFIER ASSEMBLY	PI-9005A	56502-3163385
6	AMPLIFIER ASSEM. LIST OF MAT'L	P2-9005A	56502-3163386
7	SCHEMATIC	WP-9000A	56502-3158806
8	WIRING DIAGRAM	WP-9005A	56502-3163387
9	DEMAGNETIZER	9250A	56502-3163388

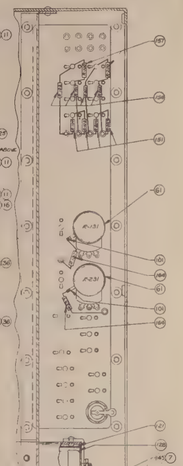
DR	H. DOUGLAS	MASTER DRAWING	THE SOUNDSCRIBER CORP NEW HAVEN, CONN.
DATE	5-9-52	AMPLIFIER ASSEMBLY LIST OF MATERIAL	P2-9005A
CH	[illegible] 6-20		
APP		SOUND RECORDER-REPRODUCER TYPE RD115/UN	NAVY DEPT BUSHIPS DWG NO
APPD. DATE	6-20-52		56502 F 3163386
		SCALE- WT-	CONT ON SHT SHT NO

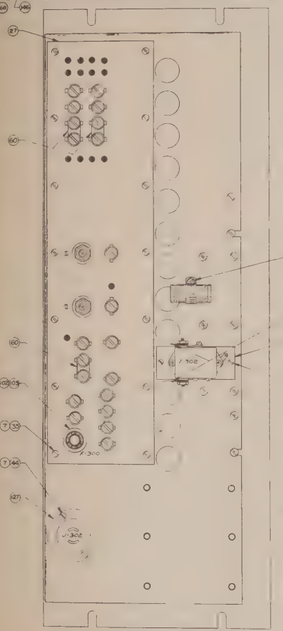


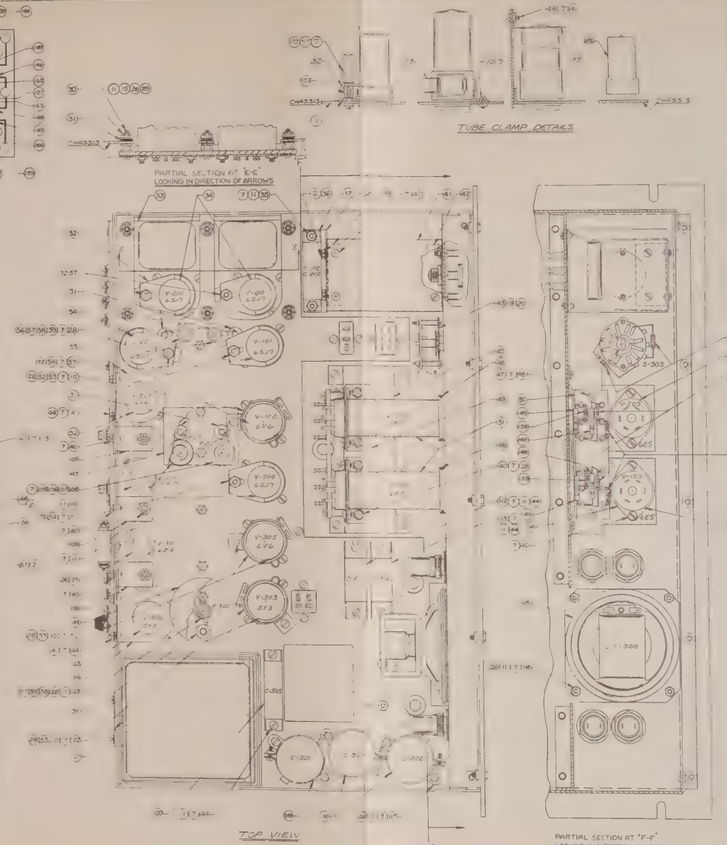












REVISIONS				
REV	DESCRIPTION	MFR	DATE	APP'D

THIS DRAWING IS PART OF A SET CONSISTING OF

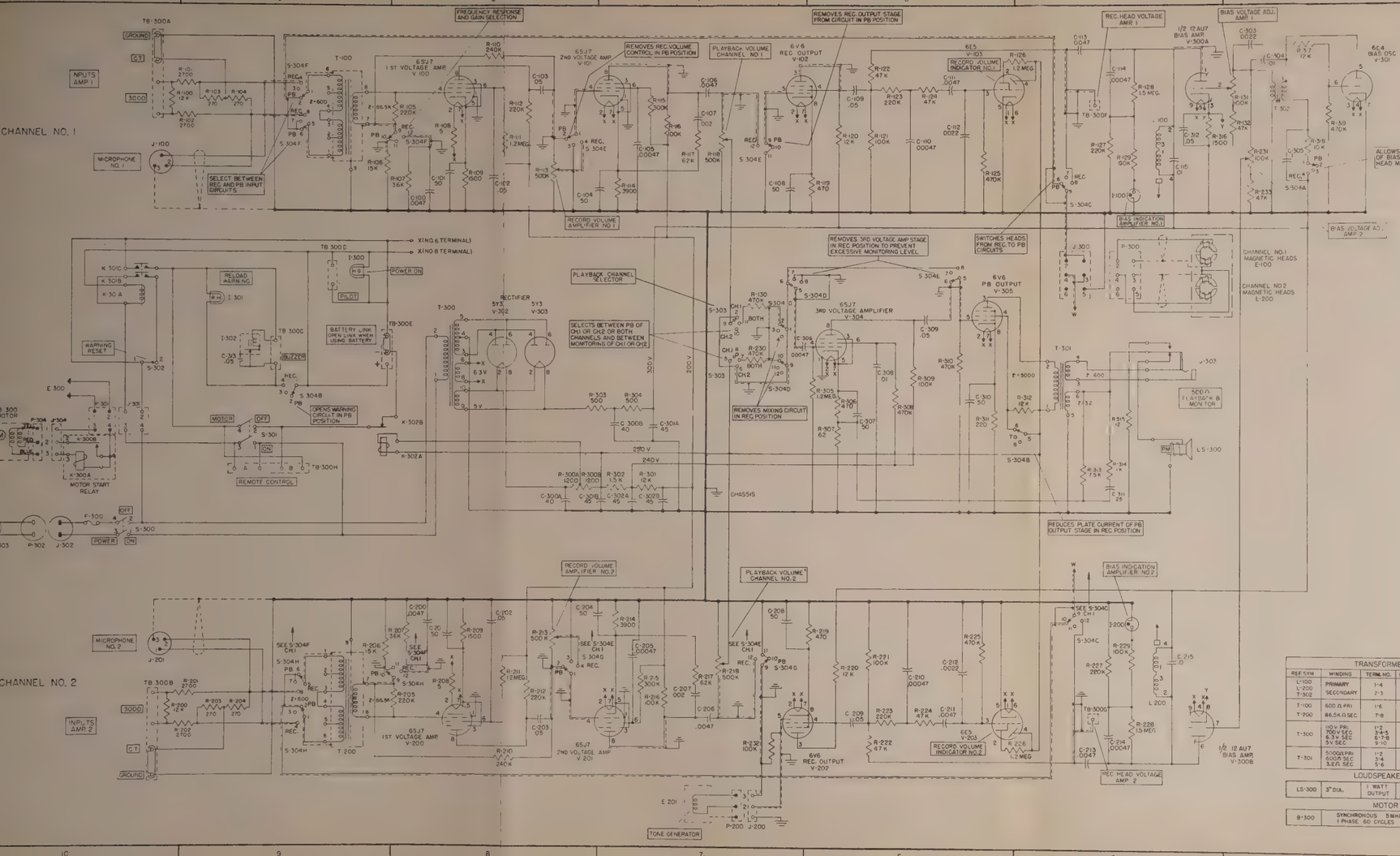
NO.	TITLE	MFR DWG NO.	BU SHIPS DWG NO
1	FINAL ASSEMBLY	9005A	56502-3158602
2	TURNTABLE ASSEMBLY	9151A	56502-3158603
3	MECHANICAL ASSEMBLY	P1-9010A	56502-3158604
4	MECH ASSEM. LIST OF MATERIAL	P2-9010A	56502-3158605
5	AMPLIFIER ASSEMBLY	P1-9005A	56502-3163385
6	AMPLIFIER ASSEM. LIST OF MATL	P2-9005A	56502-3163386
7	SCHEMATIC	SC-9005A	56502-3158606
8	WIRING DIAGRAM	WD-9005A	56502-3163387
9	DEMAGNETIZER	9230A	56502-3163388

DR	[illegible]	MASTER DRAWING
DATE	3-25-54	AMPLIFIER ASSEMBLY
CH	[illegible]	SOUND RECORDER-REPRODUCER
APP'D	L.T.	TYPE RD10/UN
APP'D	[illegible]	

THE SOUNDSCRIBER CORP.
NEW HAVEN, CONN.
P1-9005A

NAVY DEPT. BUSHIPS NO.	REV
56502 M 3163385	

SCALE 1"=1" WT. ACTUAL 27LBS COAT. OR DIP SHT



REVISIONS				
ZONE	REV	DESCRIPTION	BY	APP'D

NOTES–

1. SYMBOL DESIGNATIONS. PARTS COMMON TO THE RECORDING FUNCTION OF AMPLIFIER NO. 1 HAVE 100 SERIES SYMBOL DESIGNATIONS. PARTS COMMON TO THE RECORDING FUNCTION OF AMPLIFIER NO. 2 HAVE 200 SERIES SYMBOL DESIGNATIONS. PARTS COMMON TO BOTH AMPLIFIERS NO. 1 AND NO. 2 (POWER SUPPLY, CONTROL CIRCUITS AND PLAYBACK PARTS) HAVE 300 SERIES SYMBOL DESIGNATIONS.

2. RESISTOR VALUES ARE GIVEN IN OHMS AND CAPACITOR VALUES IN MICROFARADS K DESIGNATES 1,000- MEG DESIGNATES 1,000,000.

3. SWITCH S-304 IS THE PLAYBACK RECORD SELECTOR FOR BOTH AMPLIFIERS. THIS IS A WAFER TYPE SWITCH WITH EIGHT WAFERS MECHANICALLY GANGED TOGETHER. THESE WAFERS ARE DESIGNATED AS S-304A, S-304B, S-304C, S-304D, S-304E, S-304F, S-304G AND S-304H. THE WAFER S-304A IS LOCATED NEAREST THE FRONT PANEL; S-304B IS SECOND ETC. EACH WAFER CONTAINS THREE SWITCH SECTIONS AND EACH SECTION HAS THREE POSITIONS OF WHICH ONLY THE TWO EXTREME POSITIONS ARE USED, ONE POSITION FOR PLAYBACK AND THE OTHER FOR RECORD. THESE SWITCH SECTIONS ARE SHOWN IN THE PLAYBACK POSITION. THE TERMINALS OF EACH WAFER ARE NUMBERED ACCORDING TO THE FOLLOWING DIAGRAM:

EXAMPLE: S-304E, TERMINALS 1,2,3 AND 4. THIS SWITCH SECTION CONNECTS THE GRID OF THE SECOND VOLTAGE AMPLIFIER STAGE OF AMPLIFIER CHANNEL NO. 1 TO THE RECORD VOLUME CONTROL R-113 WHEN IN THE RECORD POSITION AND CONNECTS THIS SAME GRID TO THE COUPLING CAPACITOR C-103 FROM THE FIRST VOLTAGE AMPLIFIER STAGE WHEN IN THE PLAYBACK POSITION. THIS SWITCH SECTION IS TERMINALS 1,2,3 AND 4 OF THE FIFTH WAFER FROM THE FRONT PANEL.

4. SWITCH S-303 IS THE PLAYBACK CHANNEL SELECTOR. THIS IS A WAFER SWITCH THE SAME AS THE WAFER SWITCH DESCRIBED IN THE PREVIOUS NOTE 3 EXCEPT THESE POSITIONS ARE USED INSTEAD OF TWO AND THIS WAFER ALSO HAS FOUR ADDITIONAL TERMINALS WHICH ARE USED AS ONLY SOLDER TERMINALS. THE THREE POSITIONS ARE 1, BOTH, AND 2. ONLY TWO OF THE THREE SWITCH SECTIONS ARE USED IN THIS WAFER AND THE TERMINALS ARE NUMBERED AS DESCRIBED IN THE PREVIOUS NOTE 3. THESE TWO SWITCH SECTIONS ARE SHOWN IN THE 1 POSITION INDICATING PLAYBACK FROM AMPLIFIER CHANNEL NO. 1.

5. THE TERMINALS DESIGNATED AS TB-300A, TB-300B, TB-300C, TB-300D, TB-300E, TB-300F, TB-300G AND TB-300H ARE TERMINALS ON THE REAR PANEL TERMINAL BOARD.

6. CONTACTS E-300 ARE THE CONTACTS THAT TOUCH THE MAGNETIC TAPE. THERE IS A METAL PIECE ON THE MAGNETIC TAPE LOCATED APPROXIMATELY 5 MINUTES BEFORE THE END OF THE 24 HOUR RECORDING TIME WHICH MOMENTARY CONNECTS THESE TWO CONTACTS TOGETHER TO START THE BUZZER AND LIGHT THE RELOAD WARNING LAMP INDICATING THE NEED FOR CHANGING THE MAGNETIC TAPE.

7. THIS DIAGRAM SHOWS ONE MAGNETIC HEAD FOR EACH CHANNEL, E-100 AND E-200. ACTUALLY THERE ARE FOUR SUCH HEADS CONNECTED IN SERIES FOR EACH CHANNEL.

8. THE COIL E-201 IS A TONE GENERATOR. THE COIL IS LOCATED IN A PERMANENT MAGNETIC FIELD. A REED, ACTUATED BY A GEAR SPROCKET FASTENED TO A BELT DRIVEN PULLEY, VIBRATES IN AN AIR GAP OF THE MAGNETIC FIELD THUS CREATING A VOLTAGE ACROSS THIS COIL WHICH IS APPLIED TO THE RECORDING OUTPUT OF AMPLIFIER CHANNEL NO. 2. THIS PROVIDES A PERIODIC TONE OF SHORT DURATION TO IDENTIFY THE RECORDINGS OF CHANNEL 2 ON THE MAGNETIC TAPE.

9. ALL RELAY CONTACTS AND SWITCHES WITH THE EXCEPTION OF SWITCHES S-303 AND S-304 ARE SHOWN IN THE NON-OPERATING POSITION.

10. CAPACITORS C-102 AND C-202 ARE .05 MFD CAPACITORS IN THE SAME CAN.

11. MOTOR B-300, TONE GENERATOR E-201, CONTACTS E-300 AND MOTOR START RELAY K-300 ARE PARTS OF MECHANICAL ASSEMBLY. MAGNETIC HEADS E-100 AND E-200 ARE PARTS OF TURNTABLE ASSEMBLY.

TRANSFORMER DATA

REF SYM	WINDING	TERM. NO.	NO. TURNS	WIRE SIZE	D.C. RES.
L-100 L-200 T-302	PRIMARY	1-4	250	#32 E	4.5 Ω
	SECONDARY	2-3	460	#32 E	9.6 Ω
T-100	600 Ω PRI	1-6	636	#38 E	63 Ω
T-200	86.5K Ω SEC	7-8	7200	#44 E	4000 Ω
T-300	100 V PRI 700 V SEC 6.3 V SEC 5 V SEC	1-2 3-4-5 6-7-8 9-10	272 1870 84 78	#21 E #31 E #14 E DOUBLE FIE	.5 Ω 143 Ω 0133 Ω .014 Ω
T-301	5000 Ω PRI 600 Ω SEC 3.2 Ω SEC	1-2 3-4 5-6	2180 784 58	#36 E #33 E #22 E	335 Ω 52 Ω 42 Ω

LOUDSPEAKER DATA

L5-300	3" DIA.	1 WATT OUTPUT	2.2 OHMS D.C.RES.	3.2 Ω IMPEDANCE AT 1000 CYCLES

MOTOR DATA

B-300	SYNCHRONOUS 5 R.P.M. 115 V. A.C. .4 AMPS. 1 PHASE 60 CYCLES 1800 R.P.M.	

THIS DRAWING IS PART OF A SET CONSISTING OF

NO	TITLE	MFR. DWG. NO.	BUSHIPS DWG. NO
1	FINAL ASSEMBLY	9000A	S6502-358802
2	TURNTABLE ASSEMBLY	9191A	S6502-358803
3	MECHANICAL ASSEMBLY	P1-9010A	S6502-358804
4	MECHANICAL ASSEMBLY LIST OF MATERIAL	P2-9010A	S6502-358805
5	AMPLIFIER ASSEMBLY	P1-9005A	S6502-363385
6	AMPLIFIER ASSEMBLY LIST OF MATERIAL	P2-9005A	S6502-363386
7	SCHEMATIC	W-9000A	S6502-358806
8	WIRING DIAGRAM	WP-9005A	S6502-363387
9	DEMAGNETIZER	9250A	S6502-363388

MASTER DRAWING

DATE 2-23-52

APP'D DATE

SCHEMATIC

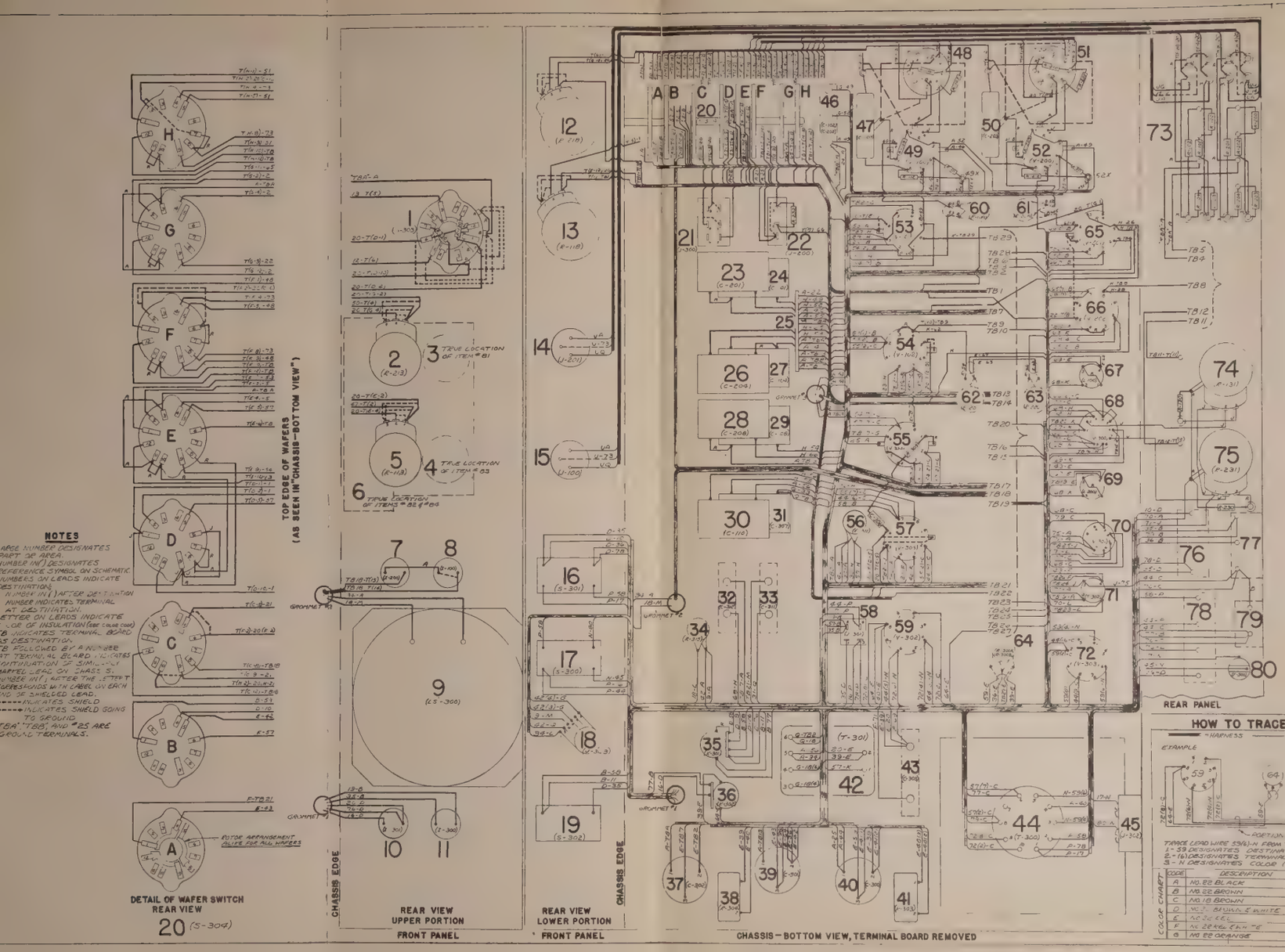
SOUND RECORDER-REPRODUCER TYPE RD 115/UN

THE SOUNDSCRIBER CORP NEW HAVEN, CONN.

W-9000 A

NAVY DEPT BUSHIPS DWG NO. REV.

S6502 | 1 | 3158806


NOTES
LARGE NUMBER DESIGNATES PART OF AREA.
(NUMBER IN) DESIGNATES REFERENCE SYMBOL ON SCHEMATIC.
NUMBERS ON LEADS INDICATE DESTINATION.
NUMBER IN ( ) AFTER DESTINATION NUMBER INDICATES TERMINAL AT DESTINATION.
LETTER ON LEADS INDICATE COLOR OF INSULATION (SEE COLOR CODE)
B INDICATES TERMINAL BOARD AS DESTINATION.
TB FOLLOWED BY A NUMBER AT TERMINAL BOARD INDICATES CONTINUATION OF SIMILARLY MARKED LEAD ON CHASSIS.
A NUMBER IN ( ) AFTER THE LETTER P CORRESPONDS WITH LABEL ON EACH END OF SHIELDED LEAD.
------ INDICATES SHIELD
------ INDICATES SHIELD GOING TO GROUND
"TBA", "TBB", AND "25" ARE GROUND TERMINALS.
DETAIL OF WAFER SWITCH REAR VIEW
20 (S-304)
TOP EDGE OF WAFERS (AS SEEN IN "CHASSIS-BOTTOM VIEW")
REAR VIEW UPPER PORTION
FRONT PANEL
REAR VIEW LOWER PORTION
FRONT PANEL
CHASSIS EDGE
CHASSIS EDGE
CHASSIS-BOTTOM VIEW, TERMINAL BOARD REMOVED
REAR PANEL
TERMINAL BOARD (AS SEEN IN "CHASSIS-BOTTOM VIEW")
BOTTOM VIEW
TOP VIEW
THESE LEADS JOIN THOSE SIMILARLY MARKED ON CHASSIS BOTTOM VIEW SKETCH
HOW TO TRACE LEADS
VOLTAGE INDICATOR ASSEMBLY
(SEE ITEMS #3, #4 & #6)
VOLTAGE AND RESISTANCE READINGS
POINT TO POINT RESISTANCE READINGS
T-100 PIN 1 TO PIN 6 = 6.5 OHMS, PIN 1 TO PIN 8 = 3800 OHMS
PIN 2 TO PIN 6 = 6.5 OHMS, PIN 2 TO PIN 8 = 3801 OHMS
PIN 3 TO PIN 6 = 17.5 OHMS
PIN 4 TO PIN 6 = 7.7 OHMS
T-101 PIN 1 TO PIN 2 = 150 OHMS, PIN 1 TO PIN 4 = 55 OHMS, PIN 1 TO PIN 6 = 6.5 OHMS
PIN 2 TO PIN 4 = 205 OHMS, PIN 2 TO PIN 6 = 155 OHMS
PIN 4 TO PIN 6 = 65 OHMS
PIN 1 TO PIN 3 = 300 K OHMS (PLAYBACK), 100 K OHMS (RECORD)
PIN 3 TO PIN 8 = 300 K OHMS (PLAYBACK), 0 OHMS (RECORD)
THIS DRAWING IS PART OF A SET CONSISTING OF
MASTER DRAWING
WIRING DIAGRAM
THE SOUNDSCRIBER CORP NEW HAVEN, CONN
WP-9005A
SCALE 1.5"=1" | WT ACTUAL
CONT ON SHT
SHT NO

MAINTENANCE PARTS KIT LIST
SOUNDSCRIBER RECORDER-REPRODUCER RD-115/UN
CONTRACT NObs-54469

No.	Qty. Per Kit	Qty. Per Set	Name of Part	S.S. Part No.	Navy Stock No.	Ref. Symbol
1	1	1	Screw, Thrust 8-32 x 1/2"	5109	#43 S16482-357	
2	2	1	Coupling, Flexible	9012A	H17SNS-10110	
3	1	1	Gasket	9033	433-P-2032	
4	1	4	Washer, Thrust 1/4" I.D. x 11/16" O.D.	9043	H17SNS-10106	
5	4	1	"V" Belt	9067	H3384152-187	
6	1	1	Spring	9063	H17SNS-10151	
7	1	1	Nut, Thumb	9070	H17SNS-10125	
8	2	2	Crank Assembly	9080A	H17SNS-10115	
9	4	1	Brush Holder Assembly	9083A	H17C84152-4157	
10	1	1	Spring	9099	H17SNS-10163	
11	1	1	Sleeve	9130	H17SNS-10108	
12	1	1	Washer, Thrust, 3/16 I.D. x 7/16 O.D.	9138	#17SNS-10105	
13	2	1	Coupling Assembly	9143A	H17SNS-10131	
14	1	1	Control Handle Assembly	9167A	H17SNS-10135	
15	4	1	Pressure Pad Assembly	9178A	H17SNS-10138	
16	1	1	Screw, Thumb	9181	H17SNS-10150	
17	1	1	Turntable Assembly	9191A	H17SNS-10140	
18	16	8	Head Assembly	9192A	H17H 39209-2501	
19	4	1	Contact Assembly	9201A	H17C84151-3030	
20	2	1	Spring, Gate	9236	H17SNS-10094	
21	1	1	Tape, Recording (incl.reel)	9255A	H17T16853-5689	
22	1	1	Washer, Thrust	9265	H17SNS-10158	
23	2	1	Spring, Tension	9266	H17SNS-10095	
24	1	1	Handle Assembly	9266A	H17SNS-10112	
25	1	1	Roller Assembly	9331A	H17SNS-10146	

Maintenance Parts Kit List
Soundscriber Recorder-Reproducer RD-115/UN
Contract NObs-54469 -2-

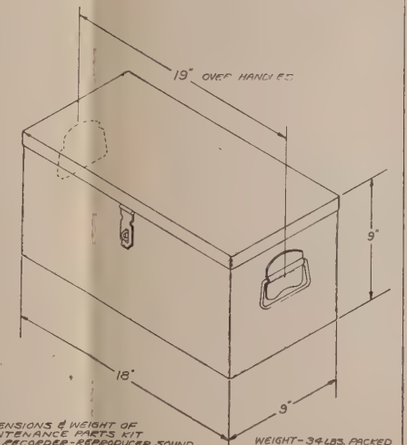
No.	Qty. Per Kit	Qty. Per Set	Name of Part	S.S. Part No.	Navy Stock No.	Ref. Symbol
26	4	1	Friction Disc, Nylon	9357	H17SNS-10097	
27	4	1	Friction Disc, Oilite	9358	H17SNS-10098	
28	1	1	Lever Assembly	9361A	H17SNS-10142	
29	1	2	Screw, Shoulder, 4-40	9381	H17SNS-10099	
30	1	2	Spacer, Steel 3/8" long #6 clearance hole	9394	H17SNS-10159	
31	1	1	Stop Assembly	9397A	H17SNS-10152	
32	1	1	Ratchet & Shaft Assembly	9405A	H17SNS-10153	
33	1	1	Reed Assembly	9408A	H17SNS-10154	
34	1	1	Clamp, Long Spring	9417	H17SNS-10155	
35	1	1	Clamp, Short Spring	9418	H17SNS-10156	
36	2	8	Ring, "E", Retaining, 3/16"	F-126	MS2857N4-800	
37	1	1	Ring, "E", Retaining, 1/8"	F-139	MS2857N3-6005	
38	2	4	Ring, "E", Retaining, 1/4"	F-149	MS2857N4-6005	
39	2	2	Ring, "E", Retaining, 5/8"	F-161	MS2857N8-0010	
40	1	2	Switch, ST2ZX	O-300	H17873082-9CX8	S-300, S-301
41	1	1	Switch, Selector	O-301	H17 S67100-6189	S-304
42	1	1	Switch, ST12B	O-302	H17870778-4284	S-302
43	1	1	Switch, Selector	O-308	H17 S62122-4894	S-303
44	6	1	Lamp, Incandescent, 6-8V, .15 amp.	V-300	017-L-6827	I-301
45	6	3	Tube, Electron, 6SJ7	V-301	N16-T-56665	V-101, V-201, V-304.
46	6	3	Tube, Electron, 6V6GT	V-302	N16-T-56758	V-102, V-202, V-305.
47	2	1	Tube, Electron, 6C4	V-303	N16-T-56214	V-301.
48	4	2	Tube, Electron, 5Y3GT	V-304	N16-T-55735	V-302, V-303.

Maintenance Parts Kit List
Soundscriber Recorder-Reproducer RD-115/UN
Contract NObs-54469 -3-

No.	Qty. Per Kit	Qty. Per Set	Name of Part	S.S. Part No.	Navy Stock No.	Ref. Symbol
49	4	2	Tube, Electron, 6E5	V-309	N16-T-56855	V-103, V-203
50	4	2	Lamp, Neon	V-313	017-L-6806-130	I-100, I-200
51	4	2	Tube, Electron, 6S27 (Selected)	V-316	N16-T-56665	V-100, V-200
52	2	1	Tube, Electron, 12AU7	V-317	N16-T-58241	V-300
53	6	1	Lamp, Incandescent 12-16V, .2 amp.	V-319	H17L6543-200	I-300
54	2	14	Washer, Centering	W-158	H17SNS-10161	
55	2	4	Washer, Centering	W-159	H17SNS-10160	
56	3	13	Washer, Fiber	W-307	H171 77253-1401	
57	2	2	Washer, Fiber	W-308	H171 77302-5971	
58	2	4	Washer, Flat, 1/4"	W-311	MS27527-702	
59	2	3	Ring, Locking	W-312	H17AHH-10406	
60	1	1	Washer, Shoulder, Fiber 3/8" I.D.	W-314	H171 49527-9987	
61	1	1	Washer, Flat, Fiber 3/8" I.D.	W-315	H171 77259-6433	
62	1	1	Ball, Steel, 1/8" Dia.	Z-112	H77B9956008200	
63	15	1	Fuse Type 3AG, 3 amps	Z-308	017F163QR-120	F-300

MAINTENANCE PARTS KIT LIST
DELAWETTER MI-1373/UN
CONTRACT NObs-54469

No.	Qty. Per Kit	Qty. Per Set	Name of Part	S.S. Part No.	Navy Stock No.	Ref. Symbol
1	1		Allen Wrench #4	761	541W2444	
2	1		Allen Wrench #6	763	541W2445	
3	1		Allen Wrench #8	765	541W2446	
4	3		Pencil, China Marking	9314	053P28624-210	
5	1		Brush, 1" Flat Varnish	9315	0388715	
6	2		Tape, Splicing - Roll	9316	H5371083-13	
7	1	1	Switch, ST45C	O-309	H17CUT-12536	
8	1		1 Box Fillers	Z-208	053P28026-600	
9	1		Non-Magnetic Screwdriver	Z-317	5415386	
10	2	1	Fuse, 10 amp. type 3AG	Z-318	H17F14327-30	
11	1		Postal Scale 8 oz.	S-306	H17SNS-10056	



DIMENSIONS & WEIGHT OF MAINTENANCE PARTS KIT FOR RECORDER-REPRODUCER, SOUND MODEL RD 115/UN

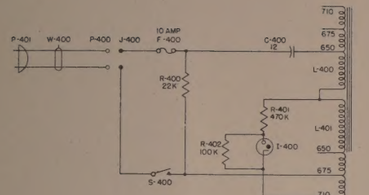
WEIGHT - 34 LBS. PACKED

REVISIONS

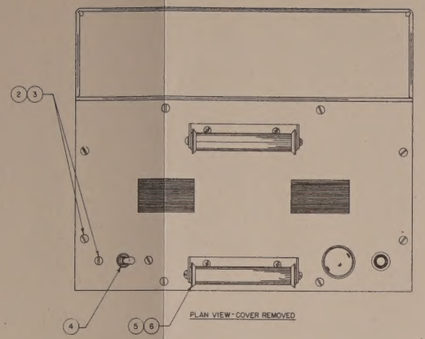
REV	DESCRIPTION	MFR DATE	MFR APPD	USN DATE	USN APPD

FOR LIST OF DRAWINGS OF WHICH THIS IS PART SEE S6502-H-3158802

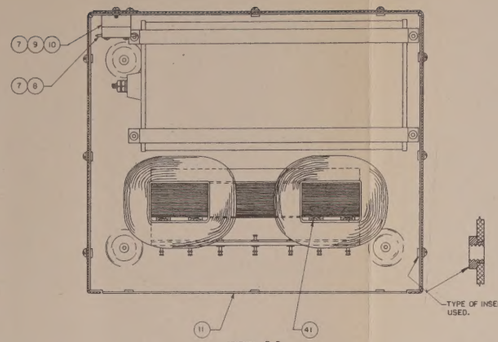
DR	R.A. Tenbusch	MASTER DRAWING	THE SOUNDSCRIBER CORP NEW HAVEN, CONN 9001A
DATE	9-18-52		
CH	JMcL 9-20-52	MAINTENANCE PARTS KIT for RD 115/UN	NAVY DEPT BUSHIPS NO / REV
APP			
APPD	DATE	STD NAVY STK NO S17-M-133502-136	S6502 D 3137392
		SCALE 1 = 4	WT. ACTUAL 34 LBS CONT ON SHT SHT NO



SCHEMATIC DIAGRAM



PLAN VIEW - COVER REMOVED



SECTION B-B

NOTES-

1. THE LEFT HAND NAMEPLATE READS AS FOLLOWS:

RECORDER-REPRODUCER, SOUND TYPE ROHS-UN
DEMAGNETIZER TYPE MX1373/UN
BU.SHIPS STOCK NO. 57-D-25491-5461
SERIAL
VOLTS 115 CYCLES 60 AMPS .5
NAVY DEPARTMENT-BUREAU OF SHIPS
SOUNDSCRIBER CORP
CONTRACT NOBS.-54469
INSP.

2. THE RIGHT HAND NAMEPLATE READS AS FOLLOWS:

OPERATION
1. TO ERASE HOLD POWER SWITCH ON FIRMLY
2. NEON LAMP MUST LIGHT BRIGHTLY
3. PLACE ROLL OF TAPE ON ROLLERS
4. ROTATE THREE COMPLETE TURNS
5. REMOVE TAPE SLOWLY
6. RELEASE POWER SWITCH
DO NOT ENERGIZE FOR MORE THAN 15 SECONDS AT A TIME FOR INTERMITTANT USE ONLY
WARNING HIGH VOLTAGE
GROUND CASE BEFORE USING
READ MANUAL BEFORE SERVICING

900 VOLTS IS DEVELOPED ACROSS CAPACITOR AND COILS.

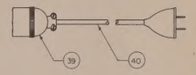
PC NO	NAME	NO REQ	MATERIAL	MTL SPEC	FINISH	CONTRACTOR DWG NO & SERVICE PART NO	BU SHIPS DWG NO	UNIT OF ISSUE	STD NAVY STOCK NO	REMARK
1	COVER ASSEMBLY	1	ALUM. ALLOY		ENAMEL	9243 A				
2	CEMENT, GLYPTAL	X				9-604				
3	SCREW, #6-32 x 5/16 FLAT HD. MACH.	10	STEEL		ZINC FL.	S-233				
4	SWITCH, POWER - ST45C	1		JAN S-23		G-309				
5	SCREW #6-32 x 3/8 RD. HD. MACH.	4	STEEL		ZINC FL.	S-199				
6	ROLLER UNIT	2	S.S. & PHEN.		ROSIN FLUX	9248 A				
7	WASHER, #6 SPLIT LOCK	30	BRONZE		NONE	W-302				
8	TERMINAL	2	BRASS, PC 2403 B		TINNED	J-164				
9	SCREW, #6-32 1/4 RD. HD. MACH.	26	STEEL		ZINC FL.	S-196				
10	PLUG, POWER	1	BRASS, PC 2403 B		ROSIN FLUX	J-309				MFR-1(a)
11	BOTTOM ASSEMBLY	1	ALUM. ALLOY		ENAMEL	9318 A				
12	LAMP, NEON - 1/4 WATT - D.C.	1				V-315				MFR-2
13	SOCKET, LAMP	1				J-344				MFR-3
14	HOLDER, FUSE	1	PHENOLIC		MOISTURE RESIS.	Z-307				MFR-4(a)
15	FUSE - 10 AMP	1				Z-318				MFR-4(b)
16	DECK ASSEMBLY	1	PHENOLIC		MOISTURE RESIS.	9445 A				
17	PLATE, INSTRUCTION	1	NIC-COP AL'Y.		NONE	D-305				
18	PLATE, NAME	1	NIC-COP AL'Y.		NONE	D-301				
19	CABINET ASSEMBLY	1	ALUM. ALLOY		ENAMEL	9249 A				
20	LUG, SOLDER	1	BRASS		TINNED	9-362				
21	SCREW, #8-32 x 3/8 RD. HD. MACH.	1	BRASS		ZINC FL.	S-236				
22	WASHER #8 FLAT	2	STEEL		ZINC PL.	W-144				
23	STRAP ASSEMBLY	2	STEEL		ZINC PL.	9252 A				
24	CAPACITOR, PAPER, .12 MFD, 1330 V A.C.	1				C-313				MFR-5
25	SCREW #8-32 3/4 RD HD MACH	4	STEEL		ZINC FL.	S-235				
26	WASHER #8 SPLIT LOCK	8	BRONZE		NONE	W-303				
27	SCREW, #8-32 3/8 RD HD MACH	4	STEEL		ZINC FL.	S-234				
28	SCREW, #8-32 7/16 RD HD MACH	4	STEEL		ZINC FL.	S-178				
29	FOOT	4	RUBBER			5098				
30	CLAMP, CABLE	2	STEEL		ZINC PL.	Z-196				
31	TERMINAL BOARD ASSEMBLY	1	PHENOLIC		MOISTURE RESIS.	9441A				
32	CORE ASSEMBLY	1	IRON		ENAMEL	9467A				
33	FRONT ASSEMBLY, CABINET	1	ALUM. ALLOY		ENAMEL	9387A				
34	COIL	2	#20 COPPER WIRE		FORMEX	9219				
35	CATCH, DRAW PULL	2	STEEL		ZINC PL.	9363				MFR-6
36	RESISTOR-100K OHMS, 1/2 WATT	1	COMPOSITION	JAN R-11		R-346				
37	RESISTOR-470K OHMS, 1 WATT	1	COMPOSITION	JAN R-11		R-347				
38	RESISTOR-22K OHMS, 2 WATT	1	COMPOSITION	JAN R-11		R-348				
39	SOCKET, POWER	1	PHENOLIC		MOISTURE RESIS.	J-310				MFR-1(b)
40	CABLE ASSEMBLY, POWER (INCLUDES J-310)	1				9218 A				10 FEET
41	WEDGE	4	MAPLE		MOISTURE RESIS.	9440				
42	LEAD WIRE, #22 STRANDED, GRAY	X		JAN C-76		K-306				
43	LEAD WIRE, #16 STRANDED, GRAY	X		JAN C-76		K-316				

THE FOLLOWING ITEMS ARE A PART OF THE MAINTENANCE KIT

	SCALE, SPRING, 0-8 OZ.	1			8-306		MFR-7
	WRENCH, #4 ALLEN	1			761		
	WRENCH, #6 ALLEN	1			763		
	WRENCH, #8 ALLEN	1			765		
	PENCIL, CHINA MARKING	3			9314		MFR-8 (a)
	BRUSH, 1" FLAT VARNISH	1			9315		
	TAPE, SPLICING	AS REQ'D			9316		MFR-9
	CRAYON LEADS, BLACK	3 BOX			Z-208		MFR-8 (b)
	SCREW DRIVER - NON-MAGNETIC	1			Z-317		

LIST OF MANUFACTURERS

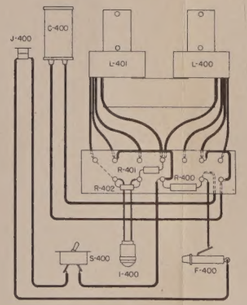
NO	NAME	ADDRESS	DESIG.
1	HARVEY-HUBBELL INC.	BRIDGEPORT, CONN.	#1 7488 #2 7488
2	GENERAL ELECTRIC CO.	BRIDGEPORT, CONN.	NE-48
3	DIALITE CORP.	NEW YORK 3, N.Y.	#2206-137
4	LITTLEFUSE CORP.	CHICAGO 40, ILL.	#1 3AG #2 3AB
5	CORNELL-DUBILIER ELECT. CO.	SO. PLAINFIELD, N.J.	R-0124
6	AMERICAN HARDWARE CORP.	NEW BRITAIN, CONN.	#15707
7	EXACT WEIGHT SCALE CO.	COLUMBUS, OHIO	
8	SCRIPTO INC.	ATLANTA, GA.	#1 #2 #3 #4 #5 #6
9	MINN. MINING & MFG. CO.	ST. PAUL 6, MINN.	"SCOTCH" #1



C-400 CAPACITOR
12 MFD., 1330 V A.C. PAPER-OIL FILLED

L-400 COIL
710 TURNS #20 FORMEX-TAPPED
5.75 OHMS ± 10% D.C. RESISTANCE
27 mh. INDUCTANCE AT 1000 CYCLES

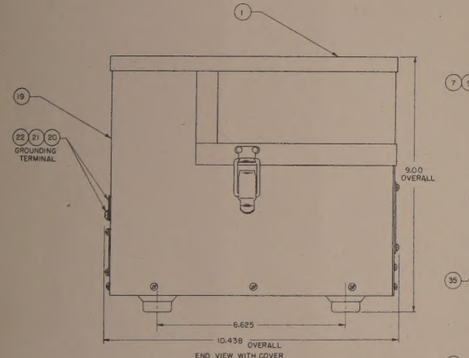
L-401
SAME AS L-400



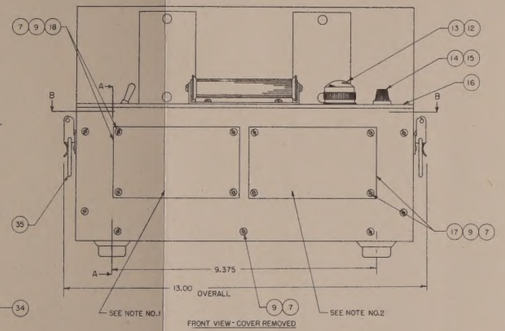
WIRING DIAGRAM

INSTRUCTIONS FOR CONNECTING COILS

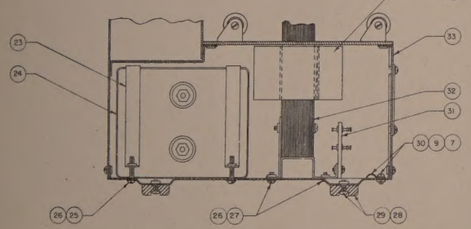
CONNECT COILS TO USE AS MANY OF THE AVAILABLE TURNS AS POSSIBLE AND STILL GET RESONANCE AT NO MORE THAN 75 VOLTS LINE INPUT



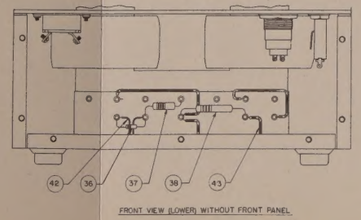
END VIEW WITH COVER



FRONT VIEW - COVER REMOVED



SECTION A-A



FRONT VIEW (LOWER) WITHOUT FRONT PANEL

FOR LIST OF DRAWINGS OF WHICH THIS IS PART
SEE 56502-H-3158802

DR	G I W	MASTER DRAWING	THE SOUNDSCRIBER CORP NEW HAVEN CONN
DATE	5-13-52		9250A
CH	[illegible]	— DEMAGNETIZER — MAGNETIC TAPE BULK ERASER ASSEMBLY TYPE MX1373/UN CONTRACT NObs. 54469	NAVY DEPT BUSHIPS NO REV
APP	L.F.		56502 H 3163388
APP'D	DATE		
2285-5	7/1/52		

SCALE: 3/4" = 1" UNLESS OTHERWISE NOTED — SHEET OF SHEETS

92025